:NTATION PAGE

Form Approved
OMB No 0704-0188

1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
	December 1980	Final

4. TITLE AND SUBTITLE
A Survey Level Report of the Below Locust Creek Landside Ditch Cleancut Project, Craighead and Greene Counties, Arkansas

5. FUNDING NUMBERS
DACW66-78-C-0054

6. AUTHOR(S)
Charles H. LeeDecker

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
Iroquois Research Institute

8. PERFORMING ORGANIZATION REPORT NUMBER

9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)
Dept. of the Army
Memphis District Corps of Engineers
B-202 Clifford Davis Federal Bldg.
Memphis, TN 38103

10. SPONSORING / MONITORING AGENCY REPORT NUMBER
111

11. SUPPLEMENTARY NOTES

12a. DISTRIBUTION / AVAILABILITY STATEMENT
Unlimited

12b. DISTRIBUTION CODE

13. ABSTRACT (Maximum 200 words)
An intensive survey for historic, prehistoric, and architectural resources was conducted. A total of four sites were inventoried duinr the survey. One of these, a prehistoric site is considered potentially eligible for inclusion in the National Register of Historic Places. Avoidance of the site duing construction is suggested.

14. SUBJECT TERMS

15. NUMBER OF PAGES
106

16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT

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A Survey Level Report

of the

BELOW LOCUST CREEK LANDSIDE DITCH

Cleanout Project

Craighead and Greene Counties, Arkansas

Archaeology, History and Architecture

Prepared for

Corps of Engineers
U. S. Army
MEMPHIS DISTRICT

UNDER CONTRACT

DACW66-78-C-0054

Prepared by

Iroquois Research Institute
with assistance from
Corps of Engineers
U. S. Army
MEMPHIS DISTRICT

DECEMBER 1980

IROQUOIS RESEARCH INSTITUTE

Principal Investigator

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Technical Director, Archaeology

ABSTRACT

An intensive survey for prehistoric, historic and architectural resources within the Below Locust Creek Landside Ditch Cleanout Project area located in northeastern Craighead and southeastern Greene Counties, Arkansas, was conducted in May 1980. Study methods included a review of published literature, a review of county, state, and Federal archival sources, a cartographic review, intensive field examination, and archaeological analysis of artifact collections. A total of four sites was inventoried during the survey. Two sites exhibited prehistoric components, including Late Archaic, Woodland, and Mississippian occupations. One site exhibited a historic component and two sites contained architectural components. The identified historic component appears to be associated with the mid-20th century. Both architectural sites are 20th century residential complexes. One prehistoric site is considered potentially eligible for inclusion in the National Register of Historic Places. The preferred option for the mitigation of adverse effects on this site will be avoidance of the site during construction.

The surveyed area is included within the Braided Terrace Physiographic Zone, primarily along a relict gathering channel. The survey results indicate occurrence rates of 10.6 prehistoric sites per square mile, 10.6 architectural sites per square mile, and 5.3 historic archaeological sites per square mile.

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INTRODUCTION

Scope of the Present Study

An intensive survey for cultural resources was conducted by Iroquois Research Institute within the right-of-way boundaries associated with the Below Locust Creek Landside Ditch Cleanout Project directed by the U. S. Army Corps of Engineers, Memphis District, under the conditions stipulated in Contract No. DACW66-78-C-0054. This project is one of more than twenty separate Component Investigation Studies included in the contract "Survey for Archaeological, Architectural, and Historic Resources Within the St. Francis Basin, Missouri and Arkansas." A Component Investigation Area Study (CIA) is a contractual term associated with discrete task authorizations. A CIA as used herein may be a reconnaissance or an intensive survey, including testing. In addition to these cultural resource reconnaissance and intensive survey (CIA) projects associated with drainage improvement projects which will be constructed by the Corps of Engineers. Iroquois also prepared a research design for a predictive model for cultural resources within the entire St. Francis Basin (Iroquois Research Institute 1978a).

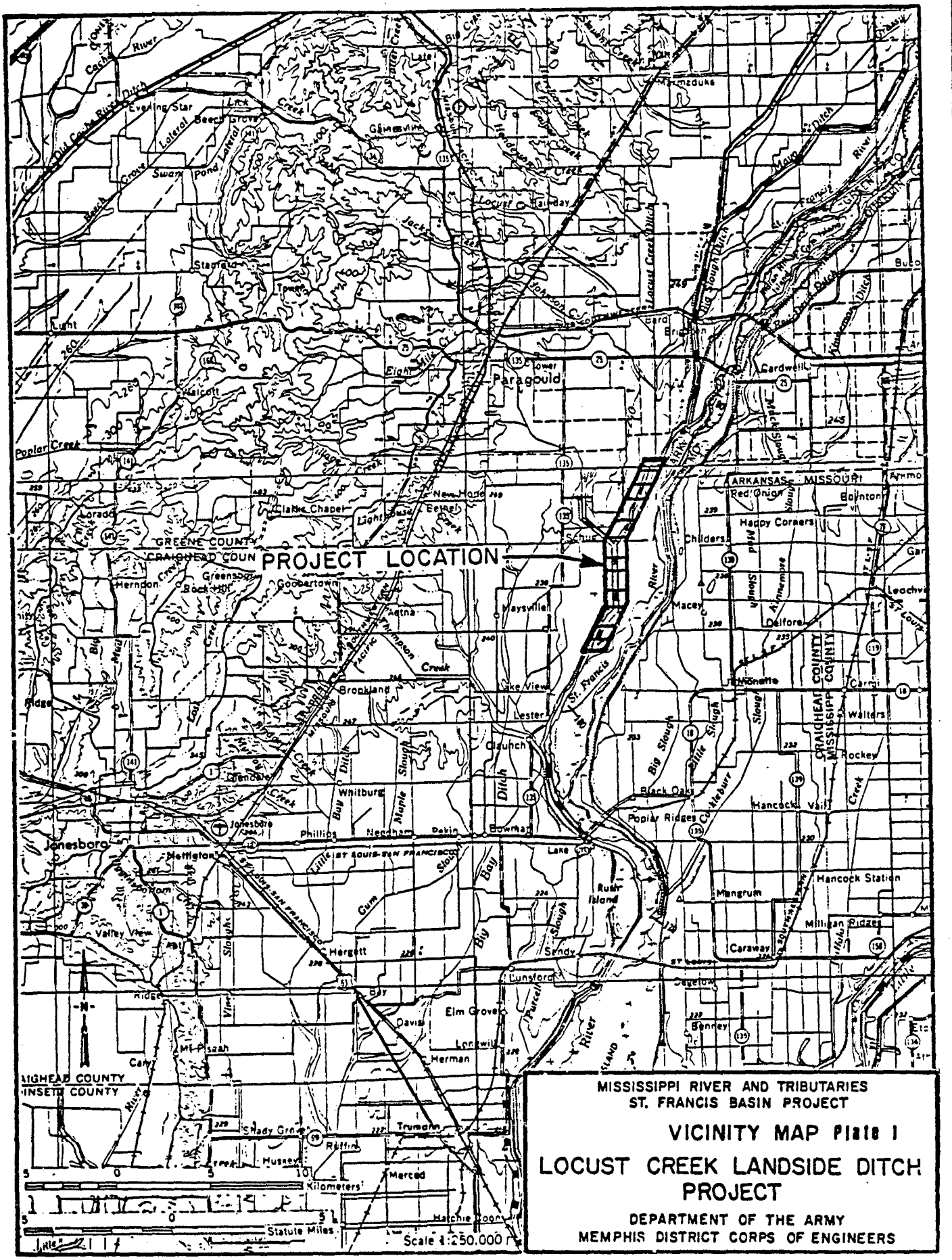
The level of investigation performed for this project is defined in the contract as follows:

> The survey level of investigation shall include (a) literature search, records review, and intensive on-the-ground examination and testing to determine (the) number and extent of resources present, cultural and scientific importance, and time and cost required to preserve, recover, or otherwise mitigate adverse impacts (Contract No. DACW66-78-C-0054, page A-4).

The study was performed as required by the National Environmental Policy Act of 1969 (Public Law 91-190), "Protection and Enhancement of the Cultural Environment" (Executive Order 11593), the Procedures for the Protection of Historic and Cultural Properties (36 C.F.R. 800), and the National Historic Preservation Act of 1966 (Public Law 89-665).

Project Location and Description

The Below Locust Creek Landside Ditch Cleanout project is located in southeastern Greene County and northeastern Craighead County, Arkansas, as indicated in Plates 1 and 2. The project will involve dredging an existing ditch which runs roughly parallel to the St. Francis River. The upstream terminus of the project is located approximately 10 kilometers (6 miles) southeast of the town of Paragould, Arkansas and 10 kilometers (6 miles) southwest of the town of Cardwell, Missouri.



MISSISSIPPI RIVER AND TRIBUTARIES
ST. FRANCIS BASIN PROJECT

VICINITY MAP Plate 1

LOCUST CREEK LANDSIDE DITCH PROJECT

DEPARTMENT OF THE ARMY
MEMPHIS DISTRICT CORPS OF ENGINEERS

Approximately 11.6 kilometers (7.2 miles) of the ditch are included in this project. For most of its length, the right-of-way is approximately 90 meters (295 feet) wide, including the existing channel and levee. The project design maps employed in this study are referenced by the U. S. Army Corps of Engineers, Memphis District under files 41L/58, 41L/59, and 41L/60.

DISPOSITION OF BACKGROUND DATA

In addition to this narrative report, cultural resource data gathered during Iroquois Research Institute's survey of the project area have been submitted to the U. S. Army Corps of Engineers, Memphis District. The data which have been submitted include (1) maps showing the location of the identified cultural resources, and (2) completed copies of the site survey forms used during the field investigation. Artifacts recovered during the field operation are currrently being curated by the Memphis District Corps of Engineers. The Federal Government will arrange for the appropriate placement of these recovered materials.

ENVIRONMENTAL SETTING

Climate

The project area is within the Humid Continental Climate zone. Weather records (USDA 1969) for the period 1931-1960 from Paragould, Arkansas, 10 kilometers (6 miles) southeast of the project area, show that the average annual maximum temperature is 22° C (71° F). The hottest month is July with a mean maximum of 33° C (92° F) and the coldest month is January with a mean maximum of 9.4° C (48° F). The average length of the growing season is 209 days, a period usually occurring between April 4th and October 30th (USDA 1969).

The average annual precipitation of 119 centimeters (46.9 inches) is fairly evenly distributed throughout the year. March is the wettest month with an average of 12.9 centimeters (5.1 inches) of rain and October is the driest month with an average of 6.9 centimeters (2.7 inches) of rain. Snowfall is negligible and sleet occurs only occasionally (USDA 1969).

The data presently available reveal only imperfectly the climate history of the St. Francis Basin. Based on a phytogeographic study of the Tunica Hills of northeastern Louisiana and the Mississippi Blufflands, Delcourt and Delcourt (1975) proposed that during the later part of the Wisconsinan Glaciation the Mississippi River Alluvial Valley and bordering blufflands were cooler and moister than the uplands on either side. This condition was the result of the cooling effects of and fogs created by the cold meltwater funneling down the Mississippi River Valley. About 16,500 B.P., climate amelioration started which by 12,500 B.P. resulted in a climate roughly similar to the area's modern climate (Delcourt and Delcourt 1975).

It is known that in the Advance Lowlands of Stoddard County in southeastern Missouri the effective rainfall was greatly diminished between 8700 and 5000 B.P. during the Atlantic climatic period. The decrease in the effective precipitation was part of an overall warming, drying, or both of the Midwest and possibly the project area which was caused by increase in the strength of the westerlies (King and Allen 1977). The presence of drier climatic conditions in the northern Mississippi Alluvial Valley might be indicated by the apparent paucity of post-Dalton, Early and Middle Archaic sites in the area, Morse (1977a). Pollen samples from a fossil lake bed south of Jonesboro examined by Dr. Peter Mehringer of the Washington State University are consistent with, but do not substantiate this theory (Morse 1977a). Even if the area was not significantly drier, the desiccation of the Missouri River Basin must have had a major impact on the Mississippi River's hydrology with indirect effects on the St. Francis River Basin.

Little is known about the Post-Atlantic climate of the project area. A summary (Wendland 1978) of paleoclimatic and paleoecological data from adjacent areas indicates that the near-surface atmospheric circulation patterns had stabilized in North America at or about their present locations by 4000 B.P. Therefore, climatic change in the project area since 4000 B.P. must have been the result of other factors such as variations in the frequency and intensity of tropical storms due to variations in sea surface temperatures (Wendland 1977).

Some apparent changes within the Early and Middle Woodland settlement patterns might indicate changes in the regional climate, vegetation, or both of the northern Mississippi Alluvial Valley (Morse 1978a).

Physiography

The entire project area lies within the lowest and youngest of two Pleistocene braided stream terraces of the Mississippi River (Saucier 1964, 1974). The average slope of the land along the alignment of the Locust Creek Landside Ditch is approximately 0.1 meter per kilometer (0.5 feet per mile). Local relief averages less than one meter (three feet) and has a maximum of approximately three meters (ten feet). The maximum elevation of the land in the vicinity of the project area is about 73 meters (240 feet) above mean sea level according to the Marmaduke, Arkansas - Missouri Quadrangle (1959) and the Leachville, Arkansas - Missouri Quadrangle (1956). The alignment of the Locust Creek Landside Ditch parallels or lies in a ponded portion of the St. Francis River which is known locally as the St. Francis Sunk Lands. It is an area of low, marshy and swampy terrain contained in a relict gathering channel in which the St. Francis River flows.

Geology

The braided stream terrace in this part of the Eastern Lowlands consists of the sediments of the Henry Formation (Willman and Frye 1970) ranging from fine, plastic clays to loamy sands (USDA 1969, 1979). In the project area, it contains well defined relict gathering channels separated by relict interfluves as indicated by the Alluvial Deposits Maps: Leachville, Arkansas - Missouri (1964). The relict interfluves possess a slightly higher elevations and sandier soils than the relict gathering channels. For most of its length, the Locust Creek Landside Ditch lies within a relict gathering channel occupied by the St. Francis River and the adjacent St. Francis Sunk Lands. It does cross one relict interfluve.

PAGES 5, 6

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Delcourt et al. (1980) suggests that boreal species of white spruce and larch occupied the frequently disturbed parts of the braided stream terraces and the adjacent bottomlands of Mississippi River's tributaries during the Wisconsin glaciation. A forest containing beech, yellow poplar, oak, hickory, black walnut, and other mesic deciduous trees covered the adjacent Blufflands and Crowleys Ridge (Delcourt and Delcourt 1975, 1977). About 16,500 B.P., climatic amelioration resulted in the expansion of warm-temperature deciduous species into the Memphis region from the south. The demise of spruce and pine in the area occurred, about 12,500 B.P. (Delcourt et al. 1980). At a peat bog, the Old Field pollen site, in Stoddard County, Missouri pollen data demonstrate the presence of a mixed hardwood and oak-hickory forest in the area by at least 8800 B.P. (King and Allen 1977). Pollen samples from an ancient lake deposit near Jonesboro analyzed by Dr. Peter Mehringer of Washington State University demonstrate the dominance of oak, hickory, and elm, sometime between 8000 and 12,000 B.P. As numerous paleontological sites indicate, Pleistocene megafauna were present in the northern Mississippi River Alluvial Valley. The exact and temporal distributions of the mastodons, horse, ground sloth, tapir, and other megafauna for the Late Pleistocene and Early Holocene are uncertain (Morse 1970).

Pollen data from the old lake bed south of Jonesboro and the Old Field pollen site in southeastern Missouri demonstrate the replacement of forested lowland by prairie about 8700 B.P. By 5000 B.P. in the Old Field pollen site and presumably elsewhere in the Mississippi Alluvial Valley, the prairie was again replaced by forested swampland and other rich bottomland flora (King and Allen 1977; Morse 1977a). How widespread these changes in vegetation were and their relation to the apparent paucity of know Early and Middle Archaic sites in the area is unknown.

For the Post-Atlantic climatic periods, little is known about the vegetation of the St. Francis Basin. Most of the information concerning the climate and vegetation comes from the observations of De Soto and his expeditionary force. He described extensive swamps and river flooding that seem very much like the natural, modern floodplain (Swanton 1939).

Reconstruction of the Nineteenth century vegetation from the Government Land Office Records by Harris (1977) for the adjacent Big Lake Highlands suggest that two biotic communities occupied the project area. The project area probably contained the Cottonwood-Willow-Sycamore biotic community on the Relict Interfluves and the Cypress-Hardwood biotic community in the swamps of the St. Francis Sunk Lands.

The Cottonwood-Willow-Sycamore biotic community contained a small variety of resources. It possessed some nut-bearing trees along with hackberry, mulberry and persimmon. Deer, turkey, elk, rabbit, squirrel and other animals occupied this community, but opossum and raccoon were most abundant (Harris Ibid.)

The swamps of the St. Francis Sunk Lands probably contained the Cypress-Hardwood biotic community of Harris (1977) along with some open marsh. The community possessed various species of Hardwood along with the ubiquitous Cypress. Also, the fauna consisted of aquatic mammals such as beaver, muskrat, river otter, and mink, various species of duck and geese, turtles, newts, frogs and fish (Harris Ibid.).

Commercial lumbering in the project region started in the 1800's. Apparently it did not have a significant effect on the vegetation until the 1920's and 1930's when it was accelerated by land drainage and subsequent clearing for agriculture (King 1978). Agriculture later overshadowed logging as the prime destroyer of the native ecosystems.

The fauna of the reconstructed biotic communities are comparable to the 44 species of animals identified from the Big Lake Phase at the Zebree Site. Of these animals, only one, the passenger pigeon is extinct and another, the sandhill crane, is extirpated from the Mississippi River Valley, This evidence suggests that for at least the past 1000 years faunas and microenvironments have not radically changed in the Big Lake area (Morse et al. 1977).

BACKGROUND STUDIES

Archival Review

Federal records were reviewed to identify known cultural resources which may be in the Below Locust Creek Landside Ditch Cleanout project area. These holdings included the National Register of Historic Places, the Historic American Engineering Record and the Historic American Buildings Survey, including the Pictorial Archives of Early American Architecture and the Master Catalog of architectural Collections. No prehistoric, historic or architectural properties listed on the National Register of Historic Places or pending nomination to the Register are located within the project area. The Historic American Engineering Record and the Historic American Building Survey had no records pertaining to any structures in the project area.

State and county archives were also reviewed. Specifically the Arkansas Historic Preservation Program's listings for Craighead and Greene Counties were obtained. This source listed no historic properties in the project area.

The records of the Arkansas Archaeological Survey were consulted in order to determine if any recorded sites were located within the project area. A total of thirty-two sites were located in sections affected by the project. Twenty-nine sites were located in Craighead County and the remaining three in Greene County. Of the thirty-two sites, one is listed as historic (located in Craighead County). A summary of this information is presented in Table 1.

The project area extends into Craighead and Greene Counties and crosses the following sections: Township 15 North, Range 6 East, Sections 2, 11, 14, 15, 22, 23; Township 16 North, Range 6 East, Sections 24, 25, 35, 36; Township 16 North, Range 7 East, Section 19.

TABLE 1

PREVIOUSLY RECORDED PREHISTORIC AND HISTORIC
SITES IN THE BELOW LOCUST CREEK LANDSIDE
DITCH CLEANOUT PROJECT VICINITY

Site Number	Site Size Square Meters	Cultural Affiliation
3CG271	over 40,000	Woodland-Mississippian
3CG272	1,001- 5,000	Woodland
3CG311	1,001- 5,000	Woodland
3CG534	101- 1,000	Historic
3CG656	101- 1,000	Late Woodland-Mississippian (?)
3CG657	101- 1,000	Archaic-Mississippian (?)
3CG658	101- 1,000	Late Woodland-Mississippian (?)
3CG659	101- 1,000	Late Woodland-Mississippian (?)
3CG665	101- 1,000	Late Woodland-Mississippian (?)
3CG666	1- 100	Late Woodland-Mississippian (?)
3CG667	101- 1,000	Late Woodland-Mississippian (?)
3CG668	101- 1,000	Late Woodland-Mississippian (?)
3CG669	101- 1,000	Late Woodland-Mississippian (?)
3CG682	101- 1,000	Late Woodland-Mississippian (?)
3CG683	101- 1,000	Late Woodland-Mississippian (?)
3CG684	1- 100	Late Woodland-Mississippian (?)
3CG685	1- 100	Late Woodland-Mississippian (?)
3CG686	101- 1,000	Late Woodland-Mississippian (?)
3CG687	1,001- 5,000	Late Woodland-Mississippian (?)
3CG688	101- 1,000	Late Woodland-Mississippian (?)
3CG689	1,001- 5,000	Late Woodland-Mississippian (?)
3CG690	101- 1,000	Late Woodland-Mississippian (?)
3CG691	1,001- 5,000	Late Woodland-Mississippian (?)
3CG692	1,001- 5,000	Late Woodland-Mississippian (?)
3CG693	1,001- 5,000	Late Woodland-Mississippian (?)
3CG694	101- 1,000	Late Woodland-Mississippian (?)
3CG695	101- 1,000	Late Woodland-Mississippian (?)
3CG696	101- 1,000	Late Woodland-Mississippian (?)
3CG697	1- 101	Late Woodland-Mississippian (?)
3GE118	Unknown	Archaic (?)
3GE151	1,001- 5,000	Woodland
3GE198	5,001-20,000	Woodland, Mississippian

Cartographic Review

In order to evaluate the potential for discovering cultural resource sites within the Below Locust Creek Landside Ditch project area, map collections at the Library of Congress, the National Archives, and the U. S. Bureau of Land Management were reviewed. The purpose of this cartographic review was to provide general data on historic land use and settlement patterns as well as give a general dating method for historic and prehistoric features located during the field investigation.

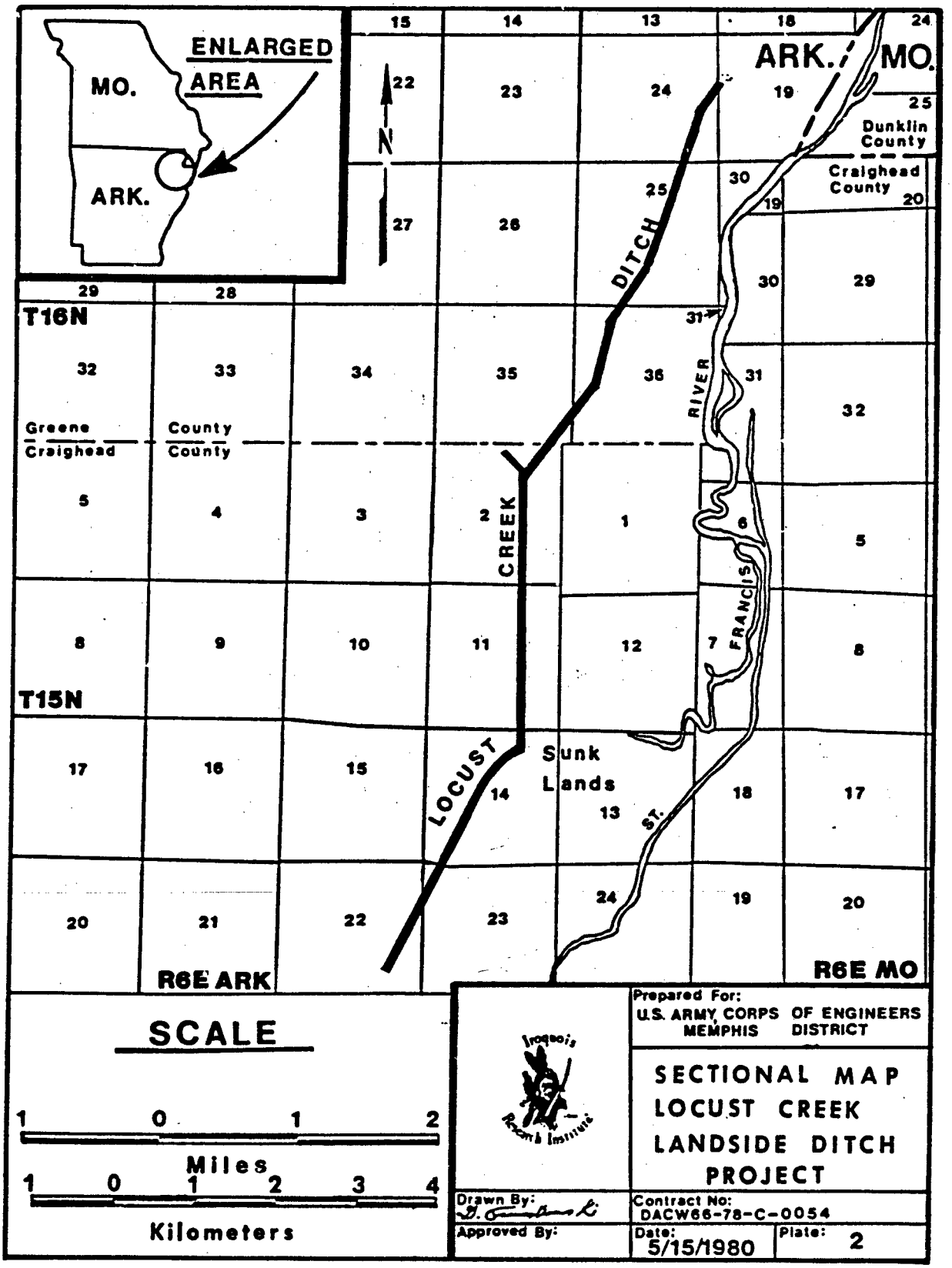
The earliest map reviewed was an 1844 map of Arkansas. It shows the Locust Creek project area as unsurveyed land and labeled as "sunk land" (1844). A road is shown running north and south to the west of the project area from Missouri through Township 21 North, Range 7 East to Township 18 North, Range 5 East. "Old Deserted Delaware Village" is written across two Townships, T16N, R5E and T17N, R6E, north and west of the project area (Ibid.).

The plat maps for Township 15 North, Range 6 East and Township 16 North, Range 6 East were issued in 1846. The only cultural features shown on these first plats are a field and path in the southwest corner of section 22, T15N, R6E. (1846). Both 1846 Plat Maps omit most of the Locust Creek project area. A meander line is entered across sections 25, 35 and 36 T16, R6E (1846b) and sections 2, 11, 14 and 22 T15N, R6E (1846a). The area to the east of this meander line is labled "waters of the St. Francis River." "Deasons Lake", which extends out of the St. Francis River into sections 11, 10 and 15 of T15N, R6E is also labled (Ibid.).

Supplemental Plat Maps were issued for Township 15 North, Range 6 East and Township 16 North, Range 6 East in 1915. Only sections that include the "meander line" of the original 1846 plats were surveyed. (1915a, 1915b) The only cultural features are drainage ditches within Township 16 North, Range 6 East (1915b). The St. Francis Drainage Ditch is located in the Southwest quadrant of Section 25 and extends north into the south east corner of section 24 T16, R6E and moves east out of the township (1915b). Locust Creek Ditch begins in the middle of the eastern boundary of section 24, extends north along the boundary and out of the Township T16N, R6E. The map does not show the two ditches intersecting.

The first map reviewed that indicates roads and dwellings in the immediate Below Locust Creek Landside Ditch project area is a 1915 map of Craighead County. The map shows the meander line boundary and the center line of the St. Francis River (1915c). A road is shown entering the project area (T15N, R6E) and extending east to the meander line. Deasons Lake is also shown in sections 10, 11 and 15 of T15N, R6E and the names of landowners are sometimes included (Ibid.).

A 1916 U. S. Department of Agriculture Soil Map was also reviewed. It shows the general area of the Locust Creek project area to be "Sharkey- clay with areas of sandy spots" (1916). An area of "Lintonia- fine sandy loam" is located in sections 11 and 14 T15N, R6E and a larger area of "Olivier- fine sandy loam", labled Newton Island, is located in sections 14 and 23 of T15N, R6E within the


ENLARGED AREA
MO.
ARK.
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Dunklin County
Craighead County
DITCH
RIVER
CREEK
FRANCIS
LOCUST
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Sunk Lands
T16N
T15N
Greene County
Craighead County
R6E ARK
R6E MO
SCALE
1 0 1 2
Miles
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Kilometers
Prepared For:
U.S. ARMY CORPS OF ENGINEERS
MEMPHIS DISTRICT
SECTIONAL MAP
LOCUST CREEK
LANDSIDE DITCH
PROJECT
Drawn By:
Approved By:
Contract No:
DACW66-78-C-0054
Date:
5/15/1980
Plate:
2

project area (1916). A secondary road is shown entering the project along the north boundary of section 14 T15N, R5E and 4 structures are indicated along this road (1916).

The 1947 General Highway Maps of Greene and Craighead Counties show more cultural features adjacent to the Locust Creek project area. The 1947 Highway map of Greene County does not show the upper portion of the Locust Creek Landside Ditch from the Eight Mile Creek confluence north and east through sections 35, 36, 25 and 24 T16N R6E (1947a). It does, however, show another ditch and levee to the east in sections 36 and 25 T16N R6E which follows the general line of the two drainage ditches noted in the 1915 plat map (1915a). The 1947 map of Craighead County shows the drainage ditch following the current project area through sections 2 and 11 T15N, R6E. In section 14 the map shows a ditch running south and east of the current Locust Creek Landside Ditch area curving west as it enters section 23, T15N R6E and intersecting with the current project at about the end of the project area. (1947b)

Roads and structures indicated on the Greene County Highway map are adjacent to the project area along the first quarter of the west boundary of section 36 T16 R6E. A road crosses the project area in the southeast quadrant of section 35 T16N, R6E. A house is shown in the bend of this road in the southwest corner of section 36 T16N R6E. (1947a)

On the 1947 Craighead County Highway Map roads enter the project area three times. A road is shown entering through the center of the west boundary of section 2 and ending just before the levee. Two dwellings are indicated to be on the south side of this road. One is near the project area. Another road enters along the north boundary of section 14. Five dwellings are indicated, two of which are shown to be against the levee. A road crosses the project area along the southern boundary of section 14 and ends at the earlier levee. Two dwellings are shown on the north side of the road, east of project area. Another structure is indicated in the northeast corner of Section 22.

Archaeological Background of the Study Area

The Locust Creek locality is situated in one of the richest prehistoric archaeological zones in the eastern United States. From Craighead County alone, over 600 archaeological sites have been reported and entered in the records of the Arkansas Archaeological Survey. These recorded sites are believed to represent only a small fraction of the total resource base of the area. Northeastern Arkansas and southeastern Missouri have been subjected to archaeological investigations for almost 100 years, and the area preserves a record of human occupation for at least the past 10,000 years. The prehistory of northeastern Arkansas has been synthesized within the general scheme of stages employed by Willey (1966) for the entire eastern United States, but some local variation from this scheme occurs.

The Paleo-Indian Period, usually dated from approximately 12,000 B.P. to 10,500 B.P., represents the earliest well established period of human occupation in northeastern Arkansas. Based upon data recovered from the southern and western Plains, where early Paleo-Indian occupations are best known, it is

TABLE 2

ARCHAEOLOGICAL SEQUENCE IN THE ST. FRANCIS DRAINAGE AREA

YEAR	CULTURAL PERIOD	REGIONAL PHASE NAMES	GENERAL CULTURAL TRAITS
	Historic	American Settlement	European ceramics, square nails, glass beads, gun flints, brass kettles
		European trade: Quapaw, Osage	
	Proto-Historic	De Soto Contact	Trade goods such as copper bells
A.D. 1541			
	Late Mississippian	Nodena, Parkin, Walls	Chiefdoms with large territories, large cemeteries, Nodena points, Bell Plain ceramics
	Middle Mississippian	Lawhorn, Cherry Valley, Powers, Cairo Lowland, Malden Plain, Pemiscot Bayou, Wilson, Fourche de Mas	Large planned villages with palisades, temple mounds and plazas, southeastern ceremonial complex motifs
	Early Mississippian	Big Lake, Hayti, Naylor, Beckwith, Black Bayou	Shell tempered pottery, arrow points, chiefdom organized societies, intensive corn agriculture
A.D. 800			
	Late Woodland	Baytown, Barnes, Dunklin, Buchakull, Hoecake	Check-stamped, plain, and cord-marked ceramics, expanded base points
	Middle Woodland	Helena, Le Plant, Turnage	Burial mounds, copper earspools, panpipes, effigy pipes
	Early Woodland	Tchula, Burkett, Pascola, Turkey Ridge	Pottery, beginning of horticulture
500 B.C.			
	Late Archaic	Poverty Point, Frierson, O'Bryan Ridge, Hugo	Stemmed and notched points, ground stone tools and ornaments, poverty point baked clay objects, tribal organization. Seasonal exploitation of upland and lowland resources
3000 B.C.	Middle Archaic		Bifurcate base points
	Early Archaic		Lanceolate points: Hardin, Cache River, Graham Cave
7000 B.C.			
	Late Paleo-Indian	Dalton, L'Anguille	Dalton point, Dalton adze, base camps, hunting and butchering camps, and cemeteries
8500 B.C.			
10,000 (Approx.)	Paleo-Indian		Fluted points. Possible hunting of Pleistocene megafauna

assumed that the exploitation of Pleistocene megafauna was a major element characterizing the subsistence pattern of Paleo-Indian peoples thoughout much of the eastern United States. It has been alternatively suggested, however, that in more humid environments of the east, the diversified floral and faunal resources would have reduced human dependence upon the hunting of large animals in the Paleo-Indian period (Byrd and Neuman 1978).

The distinctive fluted points associated with the Paleo-Indian period have been recovered in the Ozark Border region, but are apparently rare in the Saint Francis Lowlands (Price, Price et al. 1975; Price, Price, and Harris 1976; Price and Krakker 1975). An important locale for the occurrence of fluted points in the St. Francis area is situated east of Crowleys Ridge along a relict braided stream surface which probably dates to about 12,000 B.P. (Saucier 1974). Fluted points are also relatively prevalent in the Western Lowlands where the Cache River now flows into a channel in which the Cache, Black, and Saint Francis Rivers once flowed as meandering streams (Smith and Saucier 1971). Since Paleo-Indian points are limited to surface occurrences at multicomponent sites, an accurate and complete characterization of the total assemblage associated with the period in northeastern Arkansas is impossible.

Evidence of Pleistocene megafauna is present in the Saint Francis Basin. Mastodon remains have been located near the Saint Francis and Little Rivers at sites near Marmaduke, Leachville, Bay, Truman, Marked Tree, Judd Hill, and Weona (Morse 1970). At the Crow Creek site near Forrest City giant beaver, elk, horse, and ground sloth remains were located in addition to mastodon. Although no scientifically verified asociation between extinct megafauna and human artifacts exist in the area, it is purported that in 1900, an amateur archaeologist recovered two bifaces in association with mastodon remains on Island 35 in the Mississippi River (Williams 1957). These artifacts are not morphologically similar to true Paleo-Indian points, however, and the association between them and extinct fauna is probably a result of secondary deposition.

The transition between the Paleo-Indian and Early Archaic Periods is represented in northeastern Arkansas by the Dalton Period, which is estimated to date between 10,500 B. P. and 9000 B. P. Unlike the Paleo-Indian Period, Dalton complexes are well represented in the general study area from a variety of site situations. Excavations in caves and rock shelters such as Graham Cave, Missouri (Logan 1952), Stanfield-Worley Bluff Shelter, Alabama (DeJarnette et al 1952), Research Cave, Missouri (Shippee 1966), and Rodgers Shelter, Missouri (McMillan 1971) have uncovered levels containing Dalton points and associated artifacts, dietary information, and material suitable for radio-carbon dating.

A survey of sites begun by James Ford (1961) recorded hundreds of Dalton points, particularly in the L'Anguille drainage. Despite intensive collector activity, many new Dalton sites are being recorded every year in northeastern Arkansas and it appears that this habitation area was highly favorable for these hunting-gathering societies. Dalton occupation appears to be much more concentrated in northeastern Arkansas than anywhere else in the Southeast (Morse 1976). Since several Dalton sites have been excavated, much more is known about this culture than the earlier Paleo-Indian Period which is only represented by isolated finds of fluted points.

Several functional varieties of sites apparently occurred during the Dalton phase in northeastern Arkansas. A probable hunting camp has been excavated by Goodyear (1974) at the Brand site in Poinsett County. This component exhibited a series of individual working floors surrounded by artifact scatters, and a variety of finished stone tools including Dalton points, scrapers, spokeshaves, gravers, cobbles, and anvils. Based upon the absence of extremely high angle scraping tools thought to be hide-working artifacts, Goodyear (Ibid.) speculates that the Brand site area was occupied for a short time by males of a local band and used for the butchering of deer and the manufacture of stone tools.

The Lace Place represents another possible component of the Dalton phase settlement system. At this site, a wide variety of artifacts have been recovered, including adzes and other woodworking tools (Redfield and Moselage 1970). The site appears to have been intensively occupied for a significant duration of time, and may represent a base camp for a centrally based wandering Dalton band (Ibid.; Morse 1971).

Another element of the Dalton settlement system in northeastern Arkansas is present at the Sloan site in Greene County. Excavations revealed linear clusters of Dalton artifacts in contexts which suggested the presence of at least twelve individual graves. In addition to artifactual data, the presence of possible human bone fragments and the results of soil chemical tests (for P.H., calcium, and phosphurus) further substantiates the possible existence of a Dalton cemetary at this location (Morse 1975a).

Based upon an analysis of Dalton sites in northeastern Arkansas, Morse (1973a, 1977a) has hypothesised that the Dalton population was divided into virtually sedentary bands, with each band occupying a distinct drainage area. Within each drainage, the settlement patterns for each band is hypothesized to consist of a centrally placed base camp plus short term special purpose camps for activities such as butchering, hunting, plant food collecting, and chert exploitation.

This view of Dalton culture has been countered by Schiffer (1975), who suggests that a seasonal wandering pattern, with each band territory crosscutting several drainages, was more likely for Dalton populations in northeastern Arkansas. In a 1975 study of Dalton occupations in southeastern Missouri, Price and Krakker (1975) found archaeological support for the existence of seasonally occupied base camps and special purpose sites. Price and Krakker (Ibid) indicate that these data support Schiffer's model of Dalton settlement.

The Early Archaic period, estimated to fall between 9000 B.P. and 7000 B.P., apparently represents a full hunting and gathering adaptation to essentially modern environmental conditions. Early Archaic occupation in the Saint Francis lowlands appears to be considerably less intensive than during the preceding Dalton occupation. Characteristic diagnostic artifacts of the Early Archaic Period include Hardin, Cache River, Graham Cave, and Big Sandy projectile point types. These items occasionally co-occur with Dalton points in surface assemblages, which suggests a degree of temporal overlap between Dalton and Early Archaic complexes (House 1975).

Actual population movement out of the area is one possible explanation for the paucity of E: ly Archaic finds in the St. Francis Basin. Another possibility may be the inability to identify Early Archaic materials. One possible cause of depopulation is an environmental change from productive forest edge environments to drier conditions during the Hypsithermal (King and Allen 1977). Also, major hydrological changes may have taken place with braided streams changing to meandering streams (Saucier 1974).

The Middle Archaic Period dates between 7000 B.P. and 5000 B.P. is less known than the Early Archaic not only in the study area but throughout the entire eastern United States. In Tennessee, a Middle Archaic component was present at the Eva site which contained Eva points which are characterized by basal notching as typical artifacts (Lewis and Kneberg 1961). Basally notched points occur in the Ozark Highlands but rarely in northeastern Arkansas (Morse 1975b). During the Cache River project, a few basally notched points were found, but none were attributable to a particular type. A population shift into the Ozarks at the end of the Early Archaic Period is a possible explanation for the apparent lack of Middle Archaic Period sites in the Lowlands (House and Schiffer 1975).

Chapman (1975) places side notched point forms such as the Black Sand, Raddatz, Big Sandy, and White River point types in the Middle Archaic Period. They are medium sized and usually heat treated. Sandals, twined fabric, and bags are also associated with the Middle Archaic Period as well as full grooved ground stone axes and celts. Price, Price et al. (1975) feel that the Middle Archaic Period is stongly represented in the Little Black watershed area and the Ozark Escarpment. In an intensive survey of the Fourche Creek watershed, Middle Archaic sites were absent in the lowland sector but were "probably present" in the highland sector (Price, Price, and Harris 1976).

Late Archaic, 5000 B.P. to 2500 B.P., remains are very abundant in the St. Francis Lowlands. Sixty to eighty percent of the prehistoric sites in the Cache Basin have Late Archaic components (House and Schiffer 1975). Late Archaic camps, extraction sites, quarries, and workship sites have been located. The apparent increase in the number and size of sites in the Late Archaic Period may be due partly to new technologies and subsistence strategies. Typical Late Archaic artifacts include polished stone atlatl weights, full grooved axes, adzes, tubular stone beads, tubular pipes, stemmed points, and Poverty Point objects (Morse 1969). Corner notched points are also prevalent (House 1975). A common trait of Late Archaic sites is the presence of large quantities of fire cracked rock which may have been used in earth oven cooking, as were Poverty Point objects. The increased use of heavy ground stone tools and smaller projectile points suggest that economic changes occurred in this period.

Although no clear-cut evidence for Late Archaic horticulture is know in the St. Francis area, the initial cultivation of native North American and tropical cultigens probably occurred in the Late Archaic Period, as indicated by floral data from a number of sites in the central United States (Chomko 1978). The Late Archaic Period is also marked by an apparent population increase throughout much of the eastern United States, the development of interregional trading in raw materials, and sedentism in favorable environments.

Two possible Late Archaic phases have been identified for northeastern Arkansas: Frierson and Weona (Morse 1975b). The Frierson phase exhibits such traits as Big Creek points, adzes, tightly and semi-flexed burials, cut human femur tubes, small habitation mounds, and bannerstones. Separate sites with pestles, choppers, and mortars are interpreted as gathering stations. Other sites with points and scrapers may be hunting camps. Camps in the bottomlands with large amounts of fire cracked rock and debitage are possibly winter camps. The tentative Weona phase is postulated as later in time and contemporaneous with Poverty Point. An earth oven containing both fire cracked rock and Poverty Point objects were present at the Weona Site. Gary- like projectile points, stone beads, stone gorgets and "cones", plumbbobs, and steatite vessels are typical artifacts of this phase. (Ibid.).

The Woodland period, which is generally dated from 2500 B.P. to 1200 B.P., has been defined by the beginning of pottery manufacture, mound construction, and horticulture in the eastern United States (Griffin 1967). All these traits date from the Archaic Period though it is only in the Woodland Period that they become characteristic of the eastern Unites States as a whole. Faulkner (1971) hypothesized that there is little difference between the Late Archaic and Early Woodland. Morse (1975b) suggests that the trend towards depopulation which began in the terminal Archaic continues in both the Early and Middle Woodland Periods in northeastern Arkansas. In southeastern Missouri, two Early Woodland phases were described by Phillips (1970), the Burkett phase and the Pascola phase. Cormorant Cord Impressed sherds and Withers Fabric Impressed sherds are associated with these phases. Decorations such as pinching, punctation, and incision are present in the Pascola phase, similar to Early Woodland decorations elsewhere.

Later work in southeastern Missouri indicated the presence of Early Woodland occupations along the Little Black drainage based upon the identification of sherds with fabric impressions, net impressions, bossing, and zoned decoration (Price, Price et al. 1975). These traits are also characteristic of Middle Woodland ceramics as well. House (1975) found Withers Fabric Impressed pottery and one Indian Bay Stamped sherd in the extreme lower Cache Basin.

Evidence for Middle Woodland occupation in the St. Francis basin and throughout northeastern Arkansas is very scanty. House (1975) has noted isolated Early or Middle Woodland components in the lower Cache Basin, based upon the presence of Withers Fabric Impressed, Indian Bay Stamped, Marksville- like, and dentate rocker stamped sherds. It is further suggested (Ibid) that other Middle Woodland complexes probably occur in northeastern Arkansas, but are as yet unrecognized due to an absence of key diagnostic types. There is no evidence of major Hopewell influence in the Little Black drainage (Price, Price, et al. 1975) though possible Hopewellian components have been identified at the edge of the Ozark Escarpment along Castor River (Iroquois Research 1979). Phillips (1970) described the LaPlant phase in southeastern Missouri, for which dentate stamped sherds are diagnostic.

Throughout much of the eastern United States, the Middle Woodland Period is identified with the spread of the Hopewell tradition or "interaction sphere". This is usually typified by the widespread trade or exchange of exotic raw materials

such as obsidian, galena, copper, and marine shells that form part of an elaborate mortuary complex. The erection of large earthen mounds and enclosures at major Hopewellian sites indicates the presence of a sizeable and well-organized population.

True Hopewellian Middle Woodland complexes are usually limited to broad alluvial valleys that offer optimum habitats for the growth of native North American cultivars and the cultivation of tropical cultigens. (Struever and Vickery 1973). Morse has hypothesized (1977b) that the apparent abandonment of northeastern Arkansas during the Early and Middle Woodland Periods may reflect the unsuitability of the areas for the mixed gathering and horticultural subsistence base characteristic of Middle Woodland cultures.

A classic Hopewell occupation has been discovered and excavated by Ford (1963) at the Helena Crossing site on the southern edge of Crowleys Ridge near the confluence of the St. Francis River with the Mississippi. Five separate mounds with typical Hopewell log tombs were found. Artifacts recovered from six tombs in Mound C include copper panpipes, conch shell dippers, drilled wolf canine teeth, copper beads, copper earspools, olivella bends, copper tubes, and pottery vessels. Other burials were placed on the surface of the primary mound, not in tombs. Marksville stamped vessels, conch shell spoons, and beads accompanied these burials, and a pottery deposit contained many Marksville type vessels. Since that excavation, no new burial mound sites have been located in that area nor has a village site corresponding to that burial site been found.

In much of the eastern United States, the transition from the Middle Woodland to Late Woodland Period is marked by an apparent decline in mound building, interregional exchange, and burial ceremonialism. Somewhat paradoxially, however, there also appears to have been a considerable population increase in the Late Woodland Period. Griffin (1960) has associated the apparent Late Woodland decline in the central United States with a hypothesized climatic deterioration that made the cultivation of maize impossible. Struever and Vickery (1973) cite palynological evidence supporting Griffin's hypothesis. Some support for Griffin's hypothesis is also found in the apparent continuation of mound building and ceremonialism in warmer southern regions associated with cultures such as Baytown in the Lower Mississippi Valley and Weeden Island in Florida.

Brain (1971) on the other hand, argues that it was only during the Late Woodland Period that maize became important in the aboriginal subsistence pattern. He argues that the widespread adoption of maize agriculture and the bow and arrow allowed the Late Woodland populations to reorient subsistence and settlement around economically self-sufficient household units. This self sufficiency would have rendered the extensive redistribution systems implied by the Hopewellian Interaction Sphere unnecessary and allowed the dispersal of the population over a much wider area.

In contrast to the preceding Early and Middle Woodland Periods, Late Woodland complexes are extremely abundant in the St. Francis and surrounding areas of northeastern Arkansas. The intrusion of Late Woodland populations into the St. Francis area apparently involved the spread of two distinct cultural traditions, one from the south and associated with Baytown complexes, and the other from the north and represented by Barnes ceramic styles (Morse 1977b).

The Baytown period is defined by Phillips (1970) as the interval between the decline of the Hopewell and the ascendance of the Coles Creek culture. Baytown Plain pottery is "clay" or grog tempered with very few decorated sherds. Conical mounds occur in Baytown complexes, probably indicating a continuation of a Middle Woodland (Hopewell) mound burial complex (Phillips et al. 1951). The Baytown phases in southeastern Missouri that J. Williams (1974) discusses are thought by Dan Morse (1977c) to be Middle Mississippian. Barnes ceramics are typically sand tempered and most often plain or cordmarked. The Barnes occupation in the northern St. Francis basin lacks many of the "complex" traits associated with Baytown cultures to the south.

Morse (1977d) suggests that the Barnes intrusion into northeastern Arkansas represents the spread of a decentralized society occupying isolated hamlets and small settlements scattered along terrace edges and natural levees. This model is consistent with the hypothesis of Late Woodland dispersion presented by Brain (1971). House and Schiffer (1975) indicate that a segmentary tribal organization is most consistent with the archaeological manifestations of Barnes culture. Baytown culture, on the other hand, is represented by mounds and large villages in addition to smaller settlements, and probably is a relatively complex and highly structured political society (Morse 1977b).

Preliminary plotting of Barnes and Baytown complexes indicates that Barnes occupations tend to be concentrated in the northern St. Francis Basin along Crowleys Ridge. Baytown sites are concentrated in the southern portions of the basin. The transition zone is apparently in the vicinity of Jonesboro, Arkansas. Toward the end of the Late Woodland Period, Baytown culture expands in the basin and encroaches upon Barnes territory (Ibid). Late Woodland cultures endure to approximately 1200 B.P. in northeastern Arkansas.

The Mississippian Period is characterized by the spread of shell-tempered pottery, platform mounds, and the large scale cultivation of maize (Phillips, Ford, and Griffin 1951; Willey 1966; Jennings 1974). There was apparently a tremendous population expansion in many portions of the riverine Midwest and Southeast during the Mississippian Period, and many large political, economic, and religious centers arose, the largest being at Cahokia near East St. Louis, Illinois.

In the St. Francis basin, Morse (1977e) has suggested that the spread of Mississippian culture into the area was a result of the outright migration of a well-organized chiefdom level society into an area occupied by Barnes culture Late Woodland groups. Evidence for this migration is present at the Zebree site in Mississippi county, Arkansas. Although a Mississippian mound-plaza complex is not preserved, the site apparently consisted of a hierarchically structured village surrounded by a pallisade. Preliminary radiocarbon dating of the Early Mississippian occupation at the Zebree site ranges from 1262 B.P. to 1063 B.P. based on nine samples.

Other archaeologists propose a simultaneous development of Mississippian culture over most of the Central Mississippi Valley rather than population spread from a primary center at Cahokia. Price named a Naylor phase with flat based, cord marked, shell tempered vessels found at villages located on sand ridges

(Price, Price et al. 1975). The Naylor phase, Hoecake phase and Big Lake phase may be associated with major stream valleys which provided access to upland resources.

While migration of people from the Middle Mississippi Valley may account for the spread of Mississippian culture into some areas of the Midwest and Southeast, Mississippian culture also apparently arose in mosaic fashion in certain areas, independent of developments in the presumed "core" area of Mississippian evolution. The in situ development of Mississippian traits is documented in the Caddoan area (Newell and Krieger 1949), portions of the Lower Mississippi Valley (Ford 1951), and in the Southeast (Sears 1956).

During the Middle Mississippian Period a large number of Mississippian complexes occur in the St. Francis Basin. The Mississippian settlement system in the basin includes large permanent pallisaded mound centers, smaller villages, hamlets, isolated farmsteads, and special purpose camps. Evidence for maize agriculture is prevalent. The area apparently supported a sizeable population which may have been organized into a chiefdom-level society. Status burials and evidence of Southern Cult religious motifs are common in the large centers. Large Mississippian complexes known for this period include the Shugtown, Lawhorn, McDuffie, Bay, Banks, Cherry Valley, Lilbourn, Towasaghy, Snodgrass, and Powers Fort sites.

During the Late Mississippian Period the locus of population apparently shifted downstream in the St. Francis Basin, and depopulation occurs in southeastern Missouri. Population apparently increased along the White River associated with the Greenbriar phase, and in other areas as exemplified by the Walls, Nodena, and Parkin phases. During his march through the Southeast, in 1541, DeSoto noted that many areas were left unpopulated between the large tribal centers that he observed (Hudson 1976). It is possible that these abandoned areas represented buffer zones between the aggressive Late Mississippian chiefdoms. The effects of DeSoto's depredations and the disease epidemics that followed essentially destroyed Mississippian society, and by the 17th century virtually no evidence remained of the complex societies encountered 100 years previously by DeSoto.

In northeastern Arkansas, archaeological investigation began in the late 19th century. In 1886, William Holmes of the United States National Museum, Bureau of American Ethnology, published a detailed study of the pottery of the Mississippi Valley (Holmes 1886). In this study, he defined the "Middle Mississippi Province" which included large portions of Missouri, Arkansas, and Tennessee, parts of Mississippi, Kentucky, and Illinois, and small areas of Iowa, Indiana, Alabama, Louisiana, and Texas. The core of the Middle Mississippi Province was seen to be the contiguous sections of Arkansas, Missouri, and Tennessee, with the focal point at Pecan Point in Mississippi County, Arkansas. Holmes' study was one of the earliest detailed studies of prehistoric pottery in North America and set a precedent for the detailed description of ceramics in the Southeast.

The first published survey of sites in the area was also done by the United States National Museum, Bureau of American Ethnology. During this survey, Cyrus Thomas (1894) collected data on mound sites throughout the United States, partly to eliminate the theory common in the 19th century that the earth mounds of the Midwest and Southeast were constructed by a vanished race of Mound Builders. Under Thomas' overall direction, excavations were conducted at a a number of sites in Craighead County, Arkansas, including Carpenter's Landing, Cane Island, and the Webb Mounds.

The Webb Group, also known as Bay Mounds, contained groups of two or four vessels in one mound (Ibid.). In Mississippi County, Thomas' studies resulted in work at Pecan Point and Jackson Mounds. At Pecan Point, the largest mound was found to measure 150 x 80 x 15 feet, and a cemetery near this mound produced many burials. Several mounds were excavated at Jackson Mounds revealing stratified layers of burnt clay and ashes in addition to several burials.

Pecan Point was again investigated when C. B. Moore (1911) made his way up the Mississippi River in 1910. A total of 535 ceramic vessels were recovered in two weeks of work at the site. The site consisted of "made ground" for a depth of at least 4 feet, 6 inches and ash and house debris were present throughout this level. Skeletal material was well preserved and Moore presented 48 skulls to the U. S. National Museum, which is now the Smithsonian Institution. Many human effigy vessels as well as other effigy vessels were found at this site.

Moore stopped briefly at the Stoffle Place further up the river, where a large mound was present. Ceramic bowls and pots were discovered as well as a number of small bone pins, discoidals, a bear canine pendant, a long flint point, and deer astragali. Several burials found by Moore at this site had already been dug out, apparently by vandals.

An archaeological survey of the Lower Mississippi Alluvial Valley was conducted by Phillips, Ford and Griffin (1951) in the late 1930's and 1940's. Staying in small towns, they inquired where sites were and then checked these locations. They also used Mississippi River Commission maps to ascertain likely spots for site locations. When a site was verified, a map was drawn and surface collections were conducted. Eight sites were mapped by Phillips, Ford and Griffin in Mississippi County. Pecan Point was not one of them; it has presumably been washed into the Mississippi River some time before. Sherd collections were used to establish a ceramic typology which is still in use for this area today. The collections were also used to seriate the temporal relationship of sites and a chronology for the area was developed. Some of the data was provided by test excavations.

In his report on the Lower Yazoo Basin, Mississippi, Phillips (1970) extended the primary research of Phillips, Ford and Griffin. Although his major research focus was on sites in the State of Mississippi, Phillips described and summarized the distribution of the archaeological phases for the entire Lower Mississippi Valley from southeastern Missouri southward. He named many phases and compiled maps indicating their geographic distributions.

The Nodena site is the type site for the Nodena phase and is located in Mississippi County, Arkansas. The Nodena site was a large Mississippian Period ceremonial center covering 15.5 acres that contained at least three mounds, a plaza, and several cemetery areas which were located within a palisaded village. A large ceremonial center nearer the project area, the Chickasawba site or Blytheville Mound, may be another major ceremonial center of the Nodena phase (D. Morse 1973b, 1973c).

Excavations by the University of Alabama Museum and the University of Arkansas at the Nodena site in the 1930's concentrated on areas in which burials and their associated artifacts occurred. Almost one-fourth of the ceramic vessels recovered by the University of Arkansas in 1932 were effigy bowls and bottles that represented deer, rabbits, birds, fish, bats, snakes, turtles, dogs and human forms. The University of Alabama recovered even more material including bottles, bowls, jars, beads, pipes, flint caches, pendants, fish hooks, ear plugs and shell mask gorget. These excavations have not been fully reported. In 1973, the Arkansas Archeological Survey conducted a test excavation at the Nodena site to learn more about house size, kitchen pottery, diet, and the lithic technology of the Nodena phase (Morse 1973c).

Morse also supervised test excavations at the Armorel (Morse 1974) and Knappenberger (Klinger 1974) sites. At the Armorel site in Mississippi County, Arkansas, research designs focused on diet, house patterns and kitchen pottery. Two partial house patterns were excavated and all artifacts on the house floors were plotted. Half of the entire contents of the excavation were screened through fine mesh to recover small faunal, floral and lithic remains. As part of this research, Million (1974) studied the Armorel ceramics, particularly the technology involved in their manufacture. A study of the lithic material (Morse 1974) showed a large amount of basalt debitage, an apparent result of the manufacturing or resharpening of heavy stone tools.

Klinger excavated a two meter square test unit at the Knappenberger site, which is also in Mississippi County. The site is a seven acre village along a relict stream channel at which one mound is present. Undisturbed deposits were found below the 60-70 centimeter level and continued to 172 centimeters below the surface. Three superimposed house floors and associated features were located in this one test pit. Four vessels and one burial were also discoverd. In addition to the excavation, a controlled surface collection was conducted on three areas of the site including the area on and around the mound. More than 2,000 sherds were recovered during the surface collection and test excavation, including Neeleys Ferry Plain, Bell Plain, Barton Incised, Parkin Punctated, Barnes Cord Marked and O'Bryan Incised sherds. The lithic material recovered included debitage, a unifacial scraper, and bifaces, including Nodena and Madison points (Klinger 1974).

The Zebree site is located in northwestern Mississippi County on the western shore of Big Lake about one mile from the Arkansas-Missouri state line. Four separate excavations have taken place at the Zebree site during a 10 year period, including an initial test excavation, an extensive testing funded by the National Park Service, a full-scale mitigation excavation funded by the U. S. Army Corps of Engineers, and a final volunteer salvage excavation. This is one of the most fully sampled sites in Arkansas. Several excavation strategies were used at the site including block excavation, random square testing, backhoe trenching, and excavation of features after the overburden was removed (Anderson 1976).

The Late Woodland component at the Zebree Site is characterized by Barnes Cord Marked and Barnes Plain ceramics, a round to oval house pattern, basin shaped storage pits often lined with mussel shell, and crude bulbous and side notched points. Computer mapping of excavation data from random squares at the Zebree site showed five areas of Barnes occupation. Since no corn, beans or squash were found associated with the Barnes occupation, this may have been a winter village occupation where several extended families camped together (D. Morse 1977d).

The Big Lake phase occupation at Zebree overlies the Woodland occupation. This is an Early Mississippian component with shell tempered pottery such as Neeleys Ferry Plain, Varney Red Filmed and Wickcliffe Cord Marked ceramic types represented (Morse 1975c). Large, globular jars, salt pans, hooded bottles, and funnels are typical vessel shapes. True arrow points such as Sequoyah and Madison points, discoidals, the Cahokia microlith industry, and barbed antler harpoons are present. The occupants of the Big Lake phase built a large village of more than four acres fortified with a palisade. House clusters occur within the village. Morse (1977e) characterized this phase as an example of a highly organized, indigenous chiefdom migrating into a new territory, establishing a planned village, and later acculturating or amalgamating the less highly organized groups.

The Lawhorn phase occupation at the Zebree site is a small farmstead component with two houses and associated pits and burials. Decorated sherds such as Matthews Incised, Manly Punctated and Carson Red on Buff are present as well as effigy forms and handles. This component at Zebree is part of a settlement system which includes farmsteads, villages and major ceremonial centers (Morse 1977f).

The Lawhorn site is located in Craighead County, Arkansas, situated on a natural levee three to five feet high near the edge of the St. Francis Sunk Lands. An artifical levee and a drainage ditch now cut through the site. This site was excavated by a volunteer crew of amateur archaeologists led by John Moselage and Carl Chapman of the University of Missouri. Sand tempered pottery was found in the subsoil and shell tempered pottery was located in the houses. The majority of the 9,461 shell tempered sherds were Neeleys Ferry Plain. Minor decorated types included Old Town Red, Carson Red on Buff, Wallace Incised, and one Nodena Red and White sherd. There were strap and loop handles present. The five effigies found included a human head, two bats and two birds. Vessel shapes included bowls, wide mouth jars and a few water bottles (Moselage 1962).

Eight refuse pits and three houses were also excavated at the Lawhorn site. Puddled clay fire basins were well defined. Domestic tools such as mortars and pestles were found near the fire basins as were pottery disks. The houses were rectangular and had been burned with no evidence of daubing present. Charred material included poles, cane, thatch, and split cane matting. On one of the house floors one whetstone, two celts, one point, three disks, two awls, one hoe, one hammerstone, one antler tip, and the base of a wooden container were recovered. No post holes were located at the site. The site was about four acres in size and contained a plaza, cemetary and domicile area. Three radiocarbon dates of 625±150 years B.P., 375±150 years B.P. and 750±150 years B.P. were obtained from the site (Ibid.).

The Below Locust Creek Landside Ditch Cleanout Project is important to the prehistory of northeastern Arkansas because it is in close proximity to the Big Lake Transect (P. Morse 1976). This transect is part of a long-term project to sample all of the ecological zones in one linear area of Arkansas from the Ozarks to the Mississippi River. It is an extension of a survey transect initiated in the Cache River Archeological Project (Schiffer and House 1975) and extended during the Village Creek Survey (Klinger 1976). The Big Lake Transect project was an intensive survey of an area 15 miles long and one-quarter mile wide between the St. Francis River and the Little River. During the Big Lake Transect survey all road locations, fences, fields and types of crops as well as houses and outbuildings were mapped. Each diagnostic artifact locus was mapped as a site even if the artifact represented an isolated find. Two or more non-diagnostic artifacts near one another were also mapped as a site. All historic loci such as the trash pits from old tenant houses were mapped as sites. Volunteer students acting as field personnel surveyed 30 feet apart along the transect. Data from the transect have not yet been fully analyzed and reported.

The Arkansas Archeological Survey (AAS) site files listed a total of 133 sites in the area of the Big Lake Transect as of 8 June 1978, including 76 prehistoric components and 72 historic components. The entire Big Lake Transect is within the Braided Terrace Physiographic Zone (Iroquois Research Institute 1978a) and, using the data supplied by the AAS, site occurrence rates of 18 prehistoric sites per square mile and 17 historic sites per square mile were calculated for this portion of the Braided Terrace Physiographic Zone. Twenty of the 133 sites could not be placed within a subdivision of the Braided Terrace, whether Relict Interfluve, Relict Channel or Undifferentiated, because their locational data were not precise enough. The overall number of sites per square mile is nearly equal for the Relict Channels and Relict Interfluves. However, prehistoric sites have a higher rate of occurrence in the Relict Channels while historic sites have a higher rate of occurrence in the Relict Interfluves.

Woodland Period occupational components were the most frequently identified in the Big Lake Transect survey data: 44 of the 76 prehistoric sites had Woodland Period components. Mississippian Period occupational components were reported for 14 of the sites, but no Archaic or Paleo-Indian components had been identified in the survey inventory at the time the data were made available to Iroquois Research Institute.

West of the study area, 26 additional archaeological sites have been reported as a result of the Crowleys' Ridge transect project, a research project currently underway at the Arkansas Archaeological Survey research station at Arkansas State University, Jonesboro (Duncan 1980). Twenty five of these sites appear to be mixed component Late Woodland-Mississippian occupations, while one contains Archaic and Mississippian components.

In 1978 Iroquois Research Institute (1978b) conducted an intensive survey for cultural resources along a 13.68 kilometer (8.5 mile) stretch of the Locust Creek Channel Enlargement Project in Greene County which is contiguous with the present project. This survey resulted in the location of eight prehistoric sites, one architectural site, and seven historic sites. Two sites contained evidence of pre-Woodland or Archaic occupations and one exhibited a possible Mississippian component. Data was lacking to permit the temporal placement of the other sites.

Approximately 10 kilometers east of the current project area, Iroquois Research Institute conducted an intensive survey for cultural resources along a 4.2 mile (6.7 kilometers) section of Buffalo Creek Diversion Ditch (Iroquois Research Institute 1978c). A total of seven prehistoric sites were identified during this investigation. Woodland and Mississippian Period occupational components were identified at five of the seven sites. Three of the sites had evidence of Archaic occupations and a Dalton component was identified at one site. The ceramics identified in the survey collections include Barnes Plain, Barnes Cord Marked, Barnes Incised, Neeleys Ferry Plain, and Varney Red Filmed sherds. Diagnostic bifaces recovered during the survey include Dalton, Graham Cave, Stone Square Stemmed, Big Creek, Smith Basal Notched and Motley points. An overall rate of 10.4 prehistoric sites per square mile was calculated for the survey area, all of which is within the Braided Terrace Physiographic Zone, with 11.9 sites per square mile in the Relict Channels and 9.9 sites per square mile in the Relict Interfluves.

An intensive survey for cultural resources was conducted along 17 miles (27 kilometers) of Upper Buffalo Creek Ditch by Iroquois Research Institute (1979a). The project was contiguous with Buffalo Creek Diversion. A total of fifteen prehistoric sites were located during this survey, ten of which could be placed in a definite chronological framework. A range of occupation, beginning in the Late Archaic Period and extending through the Mississippian Period, was defined for the project area. The earlier occupations in the project area were evidenced by the presence of several diagnostic projectile point types, while later occupations, particularly during the Late Woodland and Mississippian periods were best defined by the presence of diagnostic ceramic types. Ceramic types identified in the collections inventoried from the survey include Barnes Plain, Barnes Cord Marked, Neeleys Ferry Plain, and Varney Red Filmed. An overall rate of 7.5 perhistoric sites per square mile was calculated for the survey area, all of which is within the Braided Terrace Physiographic Zone. Individual rates for the two major physiographic subdivisions, Relict Gathering Channels and Relict Interfluves are 8.2 and 0.0 sites per square mile respectively.

In 1979, Iroquois Research Institute (1979b) surveyed the Honey Cypress Ditch project, which is coterminous with both the Upper Buffalo Creek Diversion Ditch and the Upper Buffalo Creek Ditch (1979a) projects. A total of six prehistoric sites were located in the Honey Cypress Ditch project area, three of which could be placed in a definite chronological period. These three sites had evidence of Woodland Period occupation and Mississippian Period diagnostics were also found at two of them. Two medium to large stemmed points recovered from site 3MS363 were the only evidence of Archaic Period occupation recovered during the survey. The ceramics identified in the survey collections include Barnes Cord Marked, Barnes Plain, Barnes Check Stamped, Barnes Incised, Barnes Cord Marked with Incising, Neeleys Ferry Plain, and Varney Red Filmed sherds. An overall rate of 8.4 prehistoric sites per square mile was calculated for the survey area, all of which is within the Braided Terrace Physiographic Zone. In the Relict Gathering Channels 8.2 sites per square mile were discovered. The corresponding rate for the Relict Interfluves is 9.4.

In 1906, embossed copper plates depicting hawk dancers in religious regalia were discovered while plowing a field near Malden (Fowke 1910), a town which is about 64 kilometers (40 miles) northeast of the project area in Dunklin County, Missouri. These plates, know as either the Wulfing or Malden Plates, were apparently cached away and are not associated with any known village site. The hawk or eagle dancer motif which the plates depict is a manifestation of the Southeastern Ceremonial Cult which encompassed an area that included parts of Georgia, North Carolina, Tennessee, Arkansas, Missouri and Alabama, and extended as far west as Spiro, Oklahoma.

The presence of the Wulfing or Malden Plates as an isolated find suggests that the location of their discovery may have been a stop on a prehistoric trade or ceremonial route. The plates were acquired by a Mr. Wulfing and later donated to the St. Louis Art Museum. Stephen Williams (1954) later located the site at which the plates where found after he interviewed Mrs. Ray Grooms, the widow of the original discoverer. However, he only found two small sherds during his subsequent examination of the site area.

Aside from the Malden Plates, Dunklin County was rarely mentioned in the archaeological literature until the early 1950's. Early archaeological investigations overlooked this part of the Missouri bootheel and Phillips, Ford and Griffin did not include Missouri in their survey. The University of Michigan Central Mississippi Valley Survey (Griffin and Spaulding 1951) did, however, include southeastern Missouri in their study area.

Stephen Williams (1954) visited several sites in Dunklin County as part of his reseach on southeastern Missouri prehistory, and he mapped and made surface collections from the Holcomb, Old Varney River, Kennett, Langdon, Cockrum Landing and Wilkins Island sites, which are in Dunklin County, (Ibid.). Most of the sites studies by Williams are multiple component sites that had Woodland and Mississippian occupations.

The Holcomb site originally had four mounds. The main mound, which is still standing, is presently 12 feet high and 300 feet across. Barnes and Neeleys Ferry Plain ceramics as well as some decorated ceramic types such as Nodena Red and White, Hollywood White, Hollywood White Filmed and O'Bryan Incised have been identified at this site. Williams placed the site in the Malden Plain phase of the Early Mississippian Period and suggested that it was probably occupied at the time that the Wulfing Plates were originally deposited (Ibid.).

The Old Varney River site is on a tributary of the St. Francis River. A drainage ditch has been cut through the site. Williams profiled the bank of the ditch and conducted an excavation from which a sample of sherds was collected. Barnes Plain, Barnes Cord Marked, Neeleys Ferry Plain and Varney Red Filmed ceramics were identified in the collections from this site (Ibid.). This is the type site for Varney Red Filmed pottery, which is shell tempered with thick bodies and thick filming (Ibid.).

The Kennett site is also on the Old Varney River. It had one large mound that measured 12 feet high and 150 feet around its perimeter. Barnes, Mississippi or Neeleys Ferry Plain, Bell Plain, and Kimmswick Plain and Fabric Impressed ceramics were present on the surface. Williams noted significant differences between the Kennett site and the Old Varney River site, particularly in the lack of red filmed ware at the former. He placed the Kennett site in the Malden Plain phase (Ibid.).

The Langdon site covers 27 acres and is the largest site located in the Malden Plain area by Williams. At least six and perhaps eight mounds as well as a plaza were present. Both Barnes and Mississippian ceramics were identified at this site (Ibid.).

Cockrum Landing is another site which has been disturbed by ditching and recently had a mound leveled. Barnes Plain and Barnes Cord Marked, Mississippi Plain, Wickliffe, Kimmswick Plain, Varney Red Filmed, and O'Bryan Incised pottery were found. This site was also place in the Malden Plain phase (Ibid.).

Wilkins Island, a site which is on an island in the St. Francis River, has been drained. When Williams studied the site, much Barnes Cord Marked and Barnes Plain pottery as well as Mississippi Plain and red filmed sherds were present. A small percentage of Baytown Plain sherds was also identified (Ibid.)

From his survey, Williams named the Dunklin phase and the Malden Plain phase. The Dunklin phase is a Woodland phase associated with sand tempered, cord marked pottery. The Malden Plain phase is a Mississippian phase associated with plain, shell tempered pottery and Varney Red Filmed pottery (Ibid.)

During 1961 and 1962, James A. Ford and Alden Redfield conducted a survey which encompassed the lowlands of eastern Arkansas and southeastern Missouri. A local informants search was utilized and more than 400 sites were identified. Sites were mapped, surface collections were made, and test pits were excavated at many of the sites (Redfield 1971). Redfield concluded that the majority of the sites affiliated with the Dalton time period were located on tops of natural levees and in areas which would be relatively dry during flood periods. Test pits were dug on these levees and the results suggested that older sites extended into the subsurface soils with ceramics confined to the uppermost levels (Ibid.)

A prehistoric site occurrence rate of 30.4 sites per square mile was calculated for the Ditch 19 survey area, all of which is within the Braided Terrace Physiographic Zone. Rates of 8.5 sites per square mile in the Relict Channels, 19.8 sites pre square mile in the Relict Interfluves, and 50.9 sites per square mile in the Undifferentiated Braided Terrace were calculated (Iroquois Research Institute 1978d).

The Locust Creek Landside Ditch Cleanout project area is within the Braided Terrace Physiographic Zone, whose land surface was formed between 9,600 and 12,000 years ago (Saucier 1974). The remains of the oldest cultures known to have inhabited the St. Francis River Basin could therefore be found within the project area.

Data summarized by Iroquois Research Institute indicate that 64 of the 74 known Paleo-Indian and Dalton components in the St. Francis River Basin are located in the Braided Terrace Physiographic Zone; therefore, this physiographic zone is considered to have a high potential for the discovery of Paleo-Indian and Dalton remains.

Sites occupied during the Archaic Period are frequently found in the Braided Terrace Physiographic Zone, and aproximately 38% of the recorded components in ths zone are related to the Archaic Period (Iroquois Research Institute 1978a). In the St. Francis Basin, Early Archaic and Middle Archaic Period sites are relatively scarce while Late Archaic sites are much more common. It is possible that some Archaic Period sites will be discovered in the Locust Creek Landside Ditch project area, and it is most likely that these sites will have evidence of Late Archaic occupation.

Woodland Period components are the most frequently recorded in the Braided Terrace Physiographic Zone, and approximately 40% of the identified components in this physiographic zone are associated with the Woodland Period (Ibid.). Sites with Barnes ceramics predominate in the northern St. Francis Basin (Morse 1977e); therefore, it is possible that several Woodland sites with Barnes ceramics will be discovered in the survey of the Locust Creek Landside Ditch.

Mississippian components account for approximately 15% of the recorded components in the Braided Terrace Physiographic Zone.

Prior systematic surveys in the vicinity of the project area such as the Buffalo Creek Diversion (Iroquois Research Institute 1978c), Locust Creek (Iroquois Research Institute 1978b), the Honey Cypress Ditch Enlargement Project (Iroquois Research Institute 1979a), and the Big Lake Transect (D. Morse 1977d) undertaken by the Arkansas Archeological Survey have documented prehistoric site densities between eight and 30 sites per square mile. It is therefore expected that a similar rate of site density will be observed in the Below Locust Creek Landside Ditch project area.

Historical Background of the Study Area

Prior to the 1803 Louisiana Purchase, lands contiguous to the Below Locust Creek Landside Ditch project area in Greene and Craighead Counties, northeastern Arkansas, changed hands several times. Two and one-half centuries earlier, in 1541-1542, Spanish explorers led by Hernando De Soto became the first Europeans to penetrate Arkansas.

Over a century elapsed before futher exploration was pursued by Europeans, this time under the flag of France. In 1673, Father Jacques Marquette and Louis Joliet explored the mouth of the Arkansas River. In 1682, another French expedition led by La Marquis de La Salle also explored the mouth of the Arkansas River, then continued down the Mississippi to its mouth. Claiming the Mississippi Valley including present day Arkansas, as a possessior of France, La Salle named the area Louisiana in honor of his king, Louis XIV.

In 1686, the French established a settlement later named Arkansas Post at the mouth of the Arkansas River to foster trade with Indians in the interior. Articles of European manufacture were exchanged for furs, pelts and deer skins. Arkansas Post became the first permanent white settlement in the lower Mississippi Valley. The towns of St. Genevieve and Cape Girardeau were later founded by the French in 1735 and circa 1791 respectively (Houck 1908).

Owing to England's victory over France in the French and Indian War, 1754-1763, France lost to England her territories in Canada and in that part of Louisiana east of the Mississippi. To her ally, Spain, France ceded, in 1762, that part of Louisiana, including Arkansas, west of the Mississippi (Taylor 1966). The Spanish encouraged settlement in her new acquisition by offering liberal land grants (Works Progress Administration 1941).

In the 1790's, Spanish army veterans under the aegis of Benjamin Foy, from Holland, established another settlement at what subsequently was named Hopefield, Arkansas on the west bank of the Mississippi River across from present day Memphis, Tennessee (Demuth 1977).

The Native American populations DeSoto described had almost vanished by the time the French began to penetrate the region, but some new Indian settlements were established in the late 18th and early 19th centuries when small bands of Cherokee, Delaware and Shawnee emigrated into the area. The constant pressure by Euro-American settlers pushing into the Ohio and Indiana countryside was the major reason for the westward movement of those eastern Native American groups (Weslager 1972). This movement was also encouraged by the Spanish in an effort to build armed resistance to English and American expansionism after Spain acquired the Louisiana Territory from France in 1762 (Houck 1908).

One of the more important Indian settlements was established by the Delaware chief Chilletecaux where Kennett, Missouri, stands today. Other new Indian settlements included a large village populated mostly by Cherokees located in the vicinity of Wittsburg, Arkansas, and a Shawnee village located near present day Bloomfield, Missouri.

Access to the Wittsburg area could be gained by water while an Indian trail called the Natchitoches Trace stretching from Cape Girardeau to the Ozark Escarpment permitted access into Missouri (Price and Price 1978). In addition, early Euro-American settlers referred to a "Shawnee Trail" which included a road along Crowleys Ridge down to Wittsburg (Houck 1908; Hartness 1978; H. Williams 1930), and Chilletecaux cut a path extending from his settlement north to the Natchitoches Trace (Houck 1908; Douglass 1961).

For a few years, France regained possession of Arkansas. By the 1800 Treaty of San Ildefonso, Spanish authorities complied with Napoleon Bonaparte's request for return of the Louisiana Territory. Then in 1803, for the sum of $15,000,000, Napolean sold Louisiana to the United States.

From 1803 to 1819, Arkansas was governed as a district of a U. S. Territory. In 1819, Arkansas was accorded status as a U. S. territory in its own right, with the seat of government initially at Arkansas Post, then transferred to Little Rock two years later. Arkansas achieved Statehood in 1836. Three years earlier Greene County had been established with Paris its seat of county government, transferred in 1848 to Gainesville, and transferred again in 1884 to Paragould. Craighead County was established in 1859 with its capital at Jonesboro (Hansbrough 1946).

Meanwhile, the lands in what later became Craighead and Greene Counties had been opened to settlement shortly after consummation of the Louisiana Purchase. Veterans of the Revolutionary War and, subsequently, of the War of 1812, in partial payment for military services, were issued government certificates granting free farmsteads on property designated military bounty lands, including those in northeastern Arkansas (Hansbrough 1946).

During the first decade of the 19th Century, perhaps 200 settlers started farmsteads on military bounty lands on or near the St. Francis River. Then in 1811-1812, the New Madrid earthquake occurred, causing an area 150 miles long by 40 miles wide in Tennessee and northeastern Arkansas to sink from three to nine feet. Thereafter identified as "sunk country," this land was in part inundated by water. Numerous swamps were formed and river and stream beds drastically altered. Portions of northeastern Arkansas became virtually inaccessible and, at that time, uninhabitable. The early pioneers hastened to evacuate the "sunk country" for farm lands on higher grounds, where periodic floods from the Mississippi and St. Francis Rivers could not reach them (Halstead n.d.; Hansbrough 1946; Stuck 1960; Penick 1976).

Many of these settlers started farm life anew on Crowleys Ridge west of the project area in Greene and Craighead Counties. Extending 200 miles in length, more or less, from southeastern Missouri into northeastern Arkansas, Crowleys Ridge varied from one-half to 12 miles in width and from 50 feet to several hundred feet in height (Hansbrough 1946; Stuck 1960).

Pioneers migrating to northeastern Arkansas at this time could realize a common goal: acquisition of large tracts of free or relatively cheap, fertile land on which to raise cash crops, chiefly cotton and corn. However, they faced two formidable obstacles: the presence of Indians hunting on lands sought for farms; and the absence of roads for marketing crops, and for communication with the outside world in general. During the 1820's two important road systems were cut through the forests of Arkansas: the Military Road was cut westward from Memphis, Tennessee to Little Rock, Arkansas; and the Courier Trail, or Post Road, was cut from St. Louis, Missouri toward Little Rock, running through northeastern Arkansas along the eastern side of Crowleys's Ridge (Hansbrough 1946). Both roads were built to facilitate troop movements for protecting settlers, and to facilitate Indian removal from eastern Arkansas and other states to reservations farther west. Among the Indians being resettled were the Shawnee, Osage and Delaware tribes then inhabiting portions of Arkansas (Ibid.).

During the early 19th Century, pioneers utilizing the Military Road and the Courier Trail migrated to northeastern Arkansas from Tennessee, Kentucky, Mississippi, Georgia, Alabama, and North and South Carolina. Some were slave owners who brought slaves with them (Hansbrough 1946; Stuck 1960). While many sought the heights of Crowleys Ridge, others settled in the fertile St. Francis Basin bottomland producing cotton and corn. Relatively little beef livestock was raised at first: deer and other game were plentiful for supplying fresh meat. Besides, the transportation and other facilities needed for marketing livestock was practically non-existent (Hansbrough 1946).

In 1844, the Mississippi River overflowed its banks, flooding thousands of acres of farmland. Farmers in the St. Francis Basin bottomlands were forced to flee to higher ground (Stuck 1960). In 1846 to 1848, lands east of Crowley's Ridge were surveyed to ascertain the boundaries of swamplands that could not then be cultivated. In 1850, the Congress of the United States passed a law transferring title to swamplands to the states. The objective was to encourage the states to implement systems of levees and drainage ditches so the swamplands could be reclaimed for agricultural purposes (Ibid; St. Francis Levee District n.d.). Soon afterward, the Arkansas Board of Swamp Land Commissioners was organized. This body fostered a considerable amount of levee construction, some of which was destroyed by the flood of 1858. The work was not completed when the Civil War erupted (Ibid.).

On May 6, 1861, Arkansas, which had regularly sided with the Southern States on the Slavery issue, seceded from the Union to join the Confederate States of America. While there were no clashes of major magnitude in Greene and Craighead Counties during the next four years, there was one minor skirmish. On August 2, 1862, two companies of Confederate troops drove a detachment from a Federal Regiment out of Jonesboro. Confederate losses went unrecorded; Union losses were listed as 11 killed, 33 wounded and 21 missing (Stuck 1960; Hansbrough 1946; Williams 1930).

When the war ended, work draining swamplands could resume in the St. Francis Basin. In 1879, the Mississippi River Commission was established by Congress to oversee drainage projects in the Mississippi Valley. That same year, Arkansas authorized counties with lands subject to overflow to establish levee districts. A study was authorized to determine the extent of levee construction needed, together with methods for raising sufficient funds to amortize the costs involved (St. Frances Levee District n.d.; Stuck 1960).

During the next decade, major floods occurred in 1882, 1883, 1884, and 1886, overrunning hundreds of thousands of acres in northeastern Arkansas. In 1893 another major flood occurred. That same year, the St. Francis Levee District was established with the objective of constructing levees and ditches along the western bank of the Mississippi River from the Missouri-Arkansas boundary downriver to Helena, Arkansas. This was an important improvement affecting the progress of this slowly developing area. The district was initially concerned with flood control, but it later began the drainage of the "sunk lands," a process which was led by Missouri bootheel developers.

Another advance occurring during this time was the advent of the railroad to northeast rn Arkansas which opened the area to new industries. During the 1880's, C eene and Craighead Counties were crossed by (1) the Helena Branch of the St. Louis, Iron Mountain and Southern Railroad, which later became part of the Missouri Pacific Railroad Company, (2) the Texas and St. Louis Railroad Company of Arkansas, renamed in 1891 the St. Louis Southwestern Railroad Company also called "Cotton Belt Route;" and (3) the Kansas City and Memphis Railway Company (Hansbrough 1946; Stuck 1960).

Additional local railroads included some lines built by railroad promoter Louis Houck in Dunklin County (Kochtitzky 1957; Douglass 1961), as well as the St. Louis, Kennett and Southeastern and the Paragould Southeastern (Bradley 1951). The greater flexibility of the railroad, compared to the riverboat, doomed efforts to establish the St. Francis as a major navigable river.

The population increased significantly as the railroads, to promote future business, encouraged emigration to northestern Arkansas (Hansbrough 1946). Greene and Craighead Counties experienced a similar rate of growth during the 1880's, approximating 70%. Greene County population rose from 7,480 in 1880 to 12,908 in 1890; Craighead climbed from 7,037 to 12,025 in these same years (Ibid.; Stuck 1960). While the early pioneers had arrived, for the most part, from the Southern states, the later ones came form the mid-western states of Ohio, Indiana, Illinois and Missouri, as well as from Kentucky, Tennessee and Mississippi (Hansbrough 1946).

Most of the newcomers, like the settlers before them, were farmers. Now enjoying access to rail transport for sending out their farm produce and for bringing in farm implements and machinery, farmers populating the fertile lands of Crowleys Ridge and the St. Francis Basin produced rich yields of cotton, corn, grains, and fruit. For several decades, wheat and oats became important crops. The raising of beef cattle and hogs increased, now that there was rail transportation to facilitate marketing of livestock to the slaughter and meat packing houses of St. Louis, Missouri (Hansbrough 1946; Stuck 1960).

Not only agriculture, but lumber production benefited by the railroads, as vast tracts of pine, poplar, beach, ash, cypress, gum, hickory and red, white and black oak became available in massive quantities for the first time. For the next 40 years, the timber industry rivalled the agricultural industry in importance (Hansbrough 1946). Dozens of steam-powered sawmills sprang up. What is more, the woodworking industry came into being and thrived, as lumber companies, stave factories for barrel-making, shingle mills, planing mills, a venering company, a chair factory, a farm-wagon factory, a tool-handle factory and a wooden-spoke factory were established (Hansbrogh 1946, Stuck 1960).

For the most part, the new woodworking industry was situated in Paragould and Jonesboro, where railroad transportation was concentrated. Both capitals enjoyed a relatively fast rate of growth. In 1890, about 17% of the Craighead County population, i.e., 2,065 out of 12,025, resided in Jonesboro. The same year, about 13% of the Greene County population lived in Paragould, or 1,666 out of 12,908. By 1940, both cities possessed nearly one-fourth the county population, with Paragould peopled by 7,454 out of Greene County's 30,204

population and Jonesboro populated by 11,729 out of Craighead's 47,200 (Hansbrough 1946; Stuck 1960). This tendency for more and more of the county population to reside at the seat of government continued, so that by 1970, 43% of the Greene County population lived in Paragould, i.e., 10,639 out of 24,765, and 56% of the Craighead population lived in Jonesboro, or 28,962 out of 52,064.

Meantime, the timber industry, after enjoying several decades of brisk business, began dwindling as the forest on which the industry depended became depleted. By the 1920's and 1930's, the woodworking industry correspondingly, declined in importance. Other industries took root and grew, however, including a brickmaking factory, a flour mill, a cottonseed oil factory, electric-power plants, telephone companies, a shirt and a shoe factory, water works and sewage systems. The Missouri Pacific Railroad Company established a round-house and machine shops at Paragould to service and maintain a part of its rolling stock (Hansbrough 1946; Stuck 1960). The logged over timberlands were divided into 40-acre farms and either sold outright to prospective buyers or rented to sharecroppers (Dew 1968).

The agricultural picture also brightened. Lands in the St. Francis Basin that had been sparsely settled in the 1890's attracted more and more settlers as reclamation work converted one-time swamps into arable land (St. Francis Levee District n.d.). But the old nemesis, periodic flooding, lingered on. In 1912, 1913 and 1917, the farmers of St. Francis Basin were forced by floods to flee to the higher grounds of Crowleys Ridge. A new Federal policy was promulgated in 1917, whereby the Government agreed to pay half the costs necessary to finance flood control projects in the Mississippi Valley. Notwithstanding this aid, the Mississippi Valley was devastated by a flood in 1927, the worst yet, in which 600,000 persons were made homeless, including many in the St. Francis Basin (St. Francis Levee District n.d.; Stuck 1960; Clay 1976). In 1937, another disastrous flood occurred. Congress meanwhile passed several Flood Control Acts, beginning in 1928 committing the Federal Government to undertake massive flood control programs along the Mississippi River and its tributaries, under management of the Army Corps of Engineers. The Flood Control Act of 1936 embraced a comprehensive plan for controlling St. Francis River floods, including a floodway, the Wappapello Dam and Reservoir in Missouri, the Marked Tree Siphon, and about 277 miles of levee. Approximately two miles wide, the floodway served as an auxiliary channel to the St. Francis River to accommodate overflow whenever the river rose to flood levels. Drainage districts were established to build levees and dredge sloughs emptying into the St. Francis River. By 1960, the levee system was substantially completed. Swamps that once had proliferated the Craighead County portion of the St. Francis Basin were drained dry, releasing thousands of acres of more land for cultivation. In 1973, when another forbidden flood occurred, only a fraction of the damage took place that otherwise would have resulted had it not been for the St. Francis River flood control program (Stuck 1960; Clay 1976).

Agriculture, Greene and Craighead Counties' largest industry, underwent certain changes following World War I. Starting in the 1920's diversified farming was emphasized, so that a greater variety of crops could be raised on each farm, thereby reducing risks associated with single-crop farming. In addition to raising cotton, corn, beef-cattle and hogs, farmers in this area produced soybeans, sorghum, rice, apples, truck gardens, poultry, and dairy products. Wheat, on the

other hand, declined as a major crop. Eventually, soybeans rivalled cotton as the leading cash crop. During World War II, mechanization of farm operations became necessary to offset the loss to the armed forces of farm laborers. Tractors replaced horses and mules and, correspondingly, the need for hay and oats diminished. Increased costs associated with agricultural mechanization made the small farm less economical to operate. Therefore, farmers who mechanized their operations often bought or leased more acreage on which to raise their crops, with the net result that farms tended to grow larger in size, but fewer in number (Hanbrough 1946; Stuck 1960).

The expected historical potential of the project area is limited by both the terrain and the date of settlement. Even though documentary evidence suggests that the French and the Spanish passed through the area as early as the mid-16th century, there is little chance of finding evidence of this in the project area because it was swampy and generally inhospitable. The early Euro-Americans who explored the region were trappers, traders and hunters, individuals who would not have constructed permanent shelters.

Much of the area has been developed in the 20th century though there were Euro-American farmers in the area before 1850. It may be expected, then, that there could be artifacts from 19th century farmsteads which would shed light on rural life at that time. Their probable location is indicated by R. Lewis' observation (1974:32) that "the locations of the Mississippian towns and villages and the settlements of the Frontier period were isomorphic. This settlement pattern did not change appreciably until the first few decades of this century with the inception of a regional program of drainage canal excavation." However, in view of the history of cultural and natural modification and disturbance in the area, the expectations of recovering material data could be remote.

It is also possible that artifacts which could shed light on the social history of the area in the 20th century may be found. Evidence of recent settlement patterns such as remnants of sharecroppers' cabins would enhance the historical knowledge of the St. Francis River Basin. Since the region surrounding the project area has been exploited by timber, railroad and large scale agricultural interests in the last 50 years, it is possible that artifacts or remnants of roads, railroad beds or lumber mills, all of which would contribute to an understanding of the region's economic development, may be found in the project area.

Little historical archaeology has been done in the area. However, a mid 19th century well discovered at the Zebree site has been described as a separate component. Artifacts associated with this well included hand painted underglaze, pearlware, blue shell edge pearlware, a bone handled knife, a bar of lead, salt glazed stoneware, churn or jar sherds, marbles, a buckle, wood shavings and food remains (P. Morse 1977).

Architectural Background of the Study Area

Despite the existence of written information pertaining to the architecture of the St. Francis River Basin, most works fail to deal specifically with building in the region as an independent cultural expression. The researcher must therefore initially consult comparatively general writings which provide the basis for a characterization of St. Francis Basin architecture. The following paragraphs indicate the variety of sources consulted.

Histories of American architecture often include comments on the Mississippi River Valley which may be cautiously applied to St. Francis development (Morrison 1952; Gowans 1964). State and local histories prove helpful in providing socio-political context as well as identification of regional landmarks (Chester 1927; Thomas 1930; Works Progress Administration 1941; Kniffen 1971).

These sources, however, are ultimately of limited use. Permanent EuroAmerican settlement of the St. Francis project area occurred, for the most part, long after the French and Spanish colonial building activity emphasized in American architectural histories. The majority of the sources focus on formal or "high-styled" architecture, that is, those few buildings which trace their origins to an architect's drafting table. Many fail to recognize structures which have only traditional needs and construction patterns as blueprints. The latter, called folk or vernacular buildings, built from memory with local materials according to time-tested designs, comprise a major building component of the St. Francis River Basin.

The study of American vernacular architecture is a recent phenomenon. Inspired by work conducted in Great Britain, especially by Ronald W. Brunskill (1970, 1977), and by the pioneering efforts of cultural geographer Fred B. Kniffen of Louisiana State University (1936, 1965), scholars are now addressing such problems as rural house type identification, the special planning of agricultural complexes, and the origins of design elements. Many findings in the field of vernacular architecture illustrate the building tradition of the St. Francis Basin.

Publications issued by the United States Department of Agriculture and by land grant schools, such as the University of Arkansas School of Agriculture, are also fruitful sources for researching the architecture of farming areas such as the St. Francis Basin (USDA 1939; L. Anderson 1969; Midwest Plan Service 1973). It must be remembered, however, that these publications contain suggestions only and merely reflect, rather than document, building in the St. Francis region.

Cultural resource investigations conducted by Iroquois Research Institute have significantly added to the architectural information available for the region. Several resultant reports are of particular importance for evaluating building in the Below Locust Creek Landside Ditch Cleanout project area. A research design for predicting cultural resources in the St. Francis River Basin (Iroquois Research Institute 1978a) established working methodologies for field investigation, identified the architectural data base, and proposed means for ensuring precision and reliability of the latter. Several projects, including the Ditch 27 (Iroquois Research Institute 1978e), Buffalo Creek Diversion (Iroquois Research Institute 1978c), Honey Cypress Ditch (Iroquois Research Institute 1979a), and the Upper Buffalo Ditch (Iroquois Research Institute 1980) survey projects, have dealt with areas which are relatively close to the present project. The architectural sites located during these surveys have yielded information of specific importance for defining building in the Below Locust Creek Landside Ditch project area.

By the early 19th century, Kentuckians, North Carolinians and others had introduced northern European methods of log construction into the area. The log house perfectly satisfied the needs of frontier life. Its heavy, loadbearing walls formed a reasonably permanent structure. Economy of construction was asured

by the abundance of natural materials and the need for only the simplest, most portable tools (Montell and Morse 1976:9). The log house was a flexible form, lending itself to both additions and modifications. Finally, and perhaps most significantly, the log house served as a link with tradition, a reassuring and comfortable sight in an unfamiliar land.

The single pen log house, illustrated in Figure 1, is generally recognized as the basic vernacular house type of the American South and was still being built well into this century (Wilson 1974:65). A one room dwelling of roughly square dimensions, averaging 15 feet to a side, the single pen house never exceeds one and one-half stories in height. A gable roof with ridge parallel to the entrance side and board sheathing crowns the structure.

Blocks or piles of stone compose an open foundation designed to cool the house during hot and humid summers. Raising the sills of the ground also retards the deterioration of wooden elements caused by dampness and insects. The chimney of a single pen house appears at either gable end. In the early days of settlement it was constructed of woven sticks and clay and protected by a roof overhead (Montell and Morse 1976:9-16; Wilson 1970:21).

The walls of the single pen are built up of squared, split or round logs stacked horizontally and variously joined or notched at the corners. The spaces between the logs may be filled with a daubing of mud or clay with straw, or clay with wood chips. Alternatively, diagonally placed stones are used to fill the interstices. Floors are earthen when the house is not raised on piers, though puncheons, split logs laid in the ground with a flat upper surface, appear in the more sophisticated dwellings. The single pen possesses at least one door and one window, the openings for which are created by directly cutting out sections of the log walls and finishing the rough sides with boards (Herndon 1947:107; Condit 1968:20-21).

The single pen log house closely resembles the one bay house of Tidewater Virginia, especially in dimension, and, ultimately, the small houses of rural Britain (Wilson 1970:24). It is a form which represents the blending of Swedish Germanic wood construction methods, which flourished in the abundant American forests, and British spatial design. The single pen house, both widely distributed and enduring in the southern United States, may be thought of as the basic unit with which all other domestic vernacular structures are composed.

Many occupants of single pen houses eventually felt the need for greater living space. Since the medieval era, enlargement in the English housing tradition had been achieved horizontally, that is, by the addition of an interior space to a gable end (Ibid.:71).

The double pen house is essentially two single pen houses brought together under a common gable or hipped roof. Each pen retains its own entrance and a single chimney is located at one exterior end. A variation on this solution results when a chimney end serves as the juncture point for the two units. The central chimney house thus formed is called a "saddlebag" (Glassie 1968:78,102-105). When two roughly equal and square units are joined by a common roof, yet separated by an open passageway eight to 12 feet wide, a "dogtrot" house is

produced (Wilson 1974:67). The log dogtrot is the dwelling type selected as characteristic of Arkansas settlement by a number of writers (Chester 1927; Thomas 1930; Herndon 1947). Each of the double houses was eventually built as an integral type, with both parts constructed at the same time. Illustrations of these three house types can be found in Figure 1.

As settlements began to stabilize, frame construction appeared in northeastern Arkansas. This method of building is based upon a structural system in which a "skeleton" with an external protective covering bears the weight of the building. The heavy frame, medieval in origin, is constructed of squared wooden elements, connected and strengthened by the careful joining of parts and diagonal bracing. Wooden pins or iron nails secure the joints. Like log construction, heavy frame construction is traditionally dependent upon the hand-hewing of components. Nevertheless, as saw mills were established, their products were enthusiastically adopted for frame building. When economically possible, most settlers quickly exchanged their log houses for frame ones. The heavy framed house offered greater structural stability, effective protection from the elements and a degree of social status.

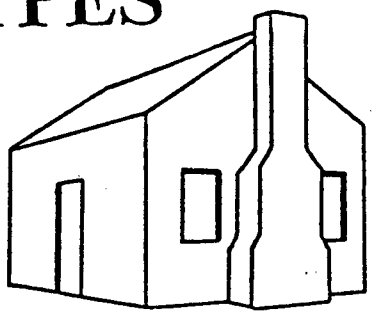
As pre-cut, dimensioned lumber came to be produced by saw mills, another type of wooden frame was made possible. The balloon frame, an American innovation of the 1830's and still the primary method of wooden construction today, was revolutionary in its use of dimensioned lumber, machined nails,and few or no heavy bracing members. The balloon frame was well suited to the needs of new settlement areas since its assembly required a minimum of carpentry skill, unlike the heavy frame, and could be achieved by the labor of a single man, unlike the log house (Herndon 1947:197; Condit 1968:43-44). Both the heavy and balloon frames are provided with weatherboards, horizontally nailed, overlapping, wooden planks which protect the exterior walls. A gable roof with ridge parallel to the entrance side is covered with wooden shingles.

Four additional vernacular house types important in the development of architecture in the St. Francis River Basin are shown in Figure 1. The simplest of the four, the medieval English hall and parlor house, possesses an asymmetrical plan of two rooms and may be of frame, masonry or log construction. The addition of interior partitions created a central passage between the two rooms. This arrangement was readily adopted and duplicated throughout the South (Glassie 1968:67-67).

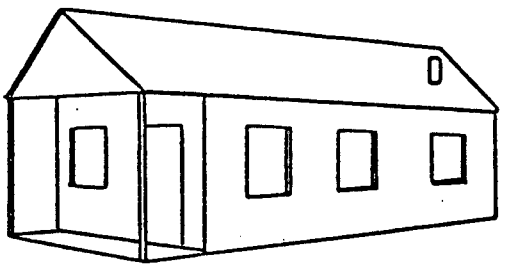
The central passage, which allows the circulation of air throughout the house, became a popular feature in both formal and folk architecture of the American South. To the dogtrot and hall and parlor forms may be added what Henry Glassie (Ibid.) has termed the "Georgian Plan, One Story House Type." The house consists of a broad central hall with flanking pairs of rooms to either long side, the internal arrangement characteristic of the formal Georgian style. Symmetry is the rule on the exterior as well. A pair of interior brick chimneys appears in the gable or hipped roof. It is a folk housing type associated with economic success.

The central passage motif appears yet again in the design of a two story, one room deep dwelling, a type found from New England to the Deep South and Midwest. Dubbed the I-house by Fred Kniffen (1936) for its occurrence in Indiana, Illinois, and Iowa, the dwelling type is three or more bays wide and has a

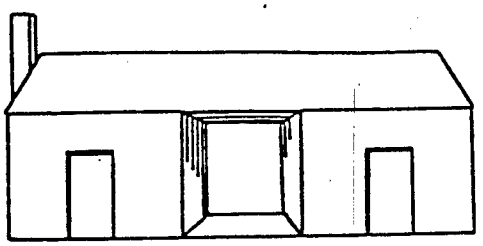
STRUCTURE TYPES



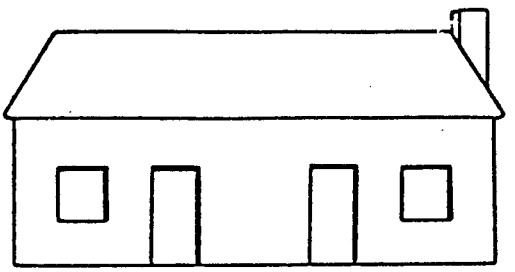
The Single Pen House



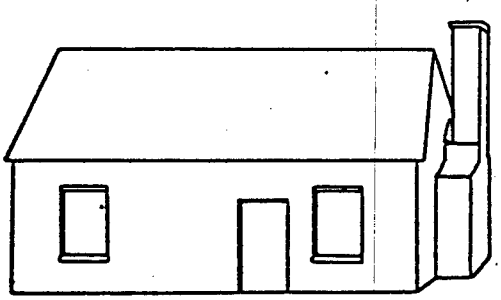
The Shotgun



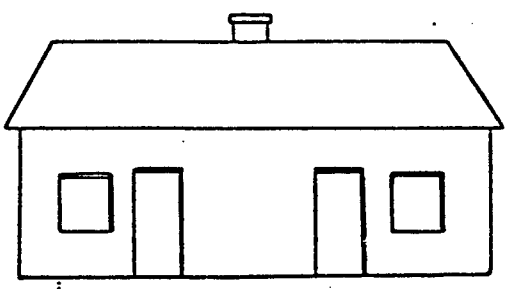
The Dogtrot



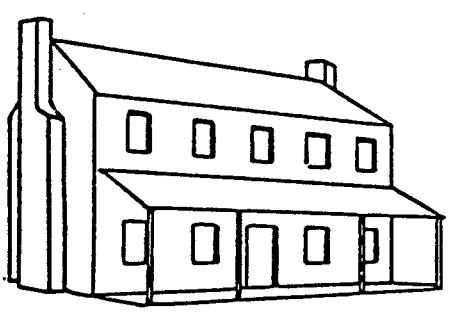
The Double Pen House



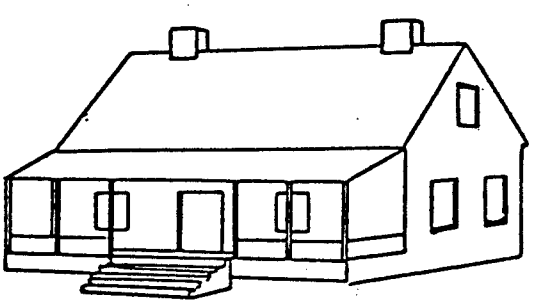
The Hall and Parlor House



The Saddlebag



The Southern I-House



The Georgian Plan, One Story House

Figure 1. The sketches above illustrate eight housing types found in the St. Francis River Basin. The houses belong to the vernacular tradition of the region. Neither designed by architects nor copied from pattern books, the houses were built by the people who would use them. The housing types are products of the ethno-geographic origins of the builders and are a function of the climatic and economic conditions of the river basin.

centrally placed front door. As with all folks types discussed thus far, the I-house has a gable or hipped roof with a ridge paralleling the entrance front. There exists many subtypes; not all have a central passage, though its presence indicates a common type, and chimney placement varies considerably. The I-house is a type built by the more prosperous inhabitants of northeastern Arkansas such as the owners of the 20th century Mississippi County cotton plantations.

The final vernacular house type shown in Figure 1 does not conform to the pattern established by those previously described, though it appears with equal frequency, especially in the Deep South. If the two front entrances of a double pen house were shifted to its gable ends, a "shotgun" house would result. Room after room may be added, one behind the other, often producing a structure of extreme length, but always one room wide. The shotgun is found in both rural and urban environments. The unusual configuration of the shotgun house has led to studies establishing an African origin for the type (Vlach 1975:29-38).

The basic domestic vernacular types just described are all subject to variations. The addition of a front porch, yet another architectural feature inspired by a hot climate, is perhaps the most common refinement of the basic house types. Porches, especially those of I-houses and Georgian plan houses, often display decoratively turned balusters and columns. Additions enclosing kitchen and dining areas, which form L-or T-shaped plans with the original structures, are also frequently observed on folk houses. Shed-roofed additions to the rear of houses are also much employed.

In his study of farmstead arrangement and design, Trewartha (1948) discovered that the average Cotton Belt farmstead contains fewer buildings than one outside the region. The buildings, moreover, are not large. A typical farm of the St. Francis region might be oriented about a dwelling with its long dimension or entrance side parallel to the principal road or waterway. The shotgun house, of course, is placed perpendicularly. Associated structures are arrayed about the main house; the barns and animal pens are always located downwind from the house. The dust from dry, unpaved roads often encouraged the set-back of houses.

The types of structures most likely to appear on St. Francis Basin farmsteads are storage sheds and variants such as corn cribs, hen houses and swine shelters. The storage shed is probably the single most numerous structure type found in the region (Iroquois Research Institutes 1979b). Constructed of roughly sawn lumber, the shed possesses a gable, single slope or flat roof and an entrance generally in its short side. A variety of entrance locations and interior partitions may adapt the shed for animal habitation.

The barns of the St. Francis Basin are essentially enlarged sheds, often with open sides or "pull-throughs" for machinery. Originally somewhat small in dimension and constructed of logs, St. Francis barns in the 19th century served mostly to store corn and wheat. Translated into frame, the barns increased in size and variety of use. Shed additions to one or both of the long sides of a gable roofed barn are common. The resultant structure is characteristic of the region and is called a broken gable barn.

The extensive drainage and flood control programs which began around the First World War changed the character of the St. Francis River Basin. The newly drained lands were found to be rich and fertile, and agricultural activity reached an efficiency and productivity never before possible. Building activity also increased as the population shifted and grew accordingly.

As the 20th century progressed, so did the availability of building materials. Log and heavy frame construction ceased to be wise choices when cheap lumber, concrete, brick, corrugated sheet metal, and asbestos shingles were so easily obtained. Vernacular forms were not totally supplanted, but the architectural character of the area underwent a profound change. Indicative of the change are two popular house types which began to dominate, especially in and near towns: the bungalow and the ranch house.

The bungalow of the 1920's and 1930's is a one story stucture with a broad overhanging gable roof supported by brackets. The ridge of the roof is perpendicular to the short or entrance front, which is usually provided with a porch. The porch is often roofed independently, producing an elevation of two or more juxtaposed gables (Whiffen 1969). The bungalow may be enlarged in a direction parallel to its roof ridge, much like the shotgun house, as can be seen in the example in Plate 12. Called the "linear bungalow," the subtype comprised 20.4% of 127 domestic structures surveyed along Route 75 between Parkin and Marked Tree, Arkansas, parallel to the St. Francis River (Iroquois Research Institute 1979b).

The ranch house is a product of the post-World War II housing shortage. Adopted from western U. S. building forms by commercial developers, the ranch house soon invaded nearly every state in the country. It is one story in height with a gable roof ridge parallel to the long or entrance front. The ranch house of brick construction in particular has been frequently observed throughout the St. Francis River Basin (Ibid.).

The presence of formal architecture in the project area is highly unlikely, especially as there are no towns or cities with banks, town halls, office buildings, and the like within the project boundaries. Agricultural structures including farm houses, barns, and assorted sheds and pens should be expected to predominate due to the economic character of the area. Concrete block for walls and foundations, the balloon frame, corrugated sheet metal roofing, and asbestos shingles for both roofs and siding will appear as the most common building materials.

The majority of structures will most likely date from the period after the success of drainage projects and consequent agricultural expansion, that is, after the First World War. Based on Iroquois Research Institute's (1978b) study of the Locust Creek project, most structues may be expected to postdate World War II.

RESEARCH DESIGN

One of the more significant advances in the state of the art of cultural resource management (CRM) has been the increased attention paid to the development and explicit use of research designs in conjunction with reconnaissance, inventory, and mitigation projects. While the use of research designs has not become a universal practice in CRM projects, there is an expanding acceptance among CRM professionals that carefully formulated research designs are prerequisite to successful applied research and to valid assessments of cultural resource significance (Goodyear, Raab and Klinger 1978; Iroquois Research Institute 1977; Raab and Klinger 1977).

The kinds of research questions asked in conjunction with a particular CRM project depend on the scope of a project and on the state of knowledge of the particular project area, that is, the kinds of questions that have already been answered by previous investigators. The primary CRM objectives of this project are: (1) to locate and inventory the cultural resources within the area that may be affected by the project, (2) to evaluate the identified resources with respect to their eligibility for inclusion in the National Register of Historic Places, (3) to determine what impact, if any, the project will have on the identified resources which appear to meet the criteria of eligibility for the National Register, and (4) to make recommendations for mitigation of adverse project related impacts on potentially eligible resources.

In addition to the research objectives related to cultural resource inventory and evaluation, the contractual scope of work also indicates that the component studies be performed in such a way as to obtain data which may be used to provide "model(s) to describe the probabilities for specific site type occurrence within the St. Francis Basin as a function of local physiographic features or other selected parameters" (Contract DACW66-78-C-0054:A-1). A research design for a predictive model of cultural resources within the St. Francis Basin has already been attempted for which the CIA studies field survey data will serve as input to help produce the probabilities for specific site type occurrence per areal unit of physiographic zone or unit of topographic feature (Iroquois Research Institute 1978a). There is a strong local interest in improving the drainage systems so that agricultural productivity may be increased; a predictive model for cultural resources in the St. Francis Basin would be a valuable planning tool for the region by providing project planners with information regarding the frequency and types of cultural resources that might be impacted by construction of a new ditch or by improvement of an existing one.

The input data necessary to power a predictive model is provided through the systematic and accurate recording of the physiographic and environmental characteristics of site locations. In addition, research related to definition of the local cultural chronology, site functions, settlement patterns, and regional relations is focused on through the investigation of all cultural resources in the component project areas.

Preliminary information on the technological, economic, and social characteristics of various prehistoric cultural periods is provided by the archaeological study of changing artifact styles, artifact assemblage characteristics, site sizes, and site locations. An analysis of site sizes and the range of artifact types present at various sites is expected to provide site function information and aid in the assessment of the behavior patterns of the prehistoric inhabitants of the Locust Creek area, as well as to provide a basis for formulation of hypotheses regarding patterns of adaptation to the natural environment. Analysis of the spatial distribution of sites associated with various time periods is also expected to contribute to an understanding of changing patterns of human behavior within a segment of the St. Francis Lowlands.

The analysis of artifact styles and the identification of exotic raw materials is expected to show the participation of the prehistoric inhabitants of the study area in regional cultural processes. Also, similarities in artifact styles is expected to indicate that other cultures in the central riverine region influenced the peoples of the Locust Creek area or that the local peoples participated in regional cultural interactions.

The St. Francis River Basin has yet to undergo rigorous historical examination. Existing studies are based primarily on regional folklore and tradition or are simply genealogical, focusing on important individuals or families. Although systematic inventories of the historic archaeological resources have been compiled in connection with several recent cultural resource projects (Krakker 1977: 149-155; Price, Price et. at. 1975:130-250), many basic questions regarding the nature and distribution of historic resources in the St. Francis Lowlands are yet unresolved.

Background research of local and regional history has outlined the broad patterns of economic, social, and political development and highlighted some of the most significant historical events which occurred in the area surrounding the Locust Creek project. While the background research is expected to provide a necessary context for analysis of any historical resources encountered during the field survey, the field survey itself is expected to provide the opportunity to apply archaeological research techniques to the solution of historical research objectives. Definition of the historic cultural and demographic patterns is the primary historical research objective which will be addressed in light of the field survey data. That research objective is to be achieved by the use of such analytical tools as the study of habitation site locations, the geographic distribution of habitation sites, and the assessment of changes in these patterns of spatial distribution through time. Field inspection of the project right-of-way is expected to provide the basis for an outline of the economic character of the area through analysis of the present land use practices and identification of agricultural structures and industrial sites such as sawmills, grain mills, and cotton gins, should such sites be discovered.

Since comparatively few studies have dealt with architecture in the St. Francis Basin, the context necessary for the analysis and assessment of structures has not yet been fully developed. The most important research objective for the discipline of architectural history, then, is the identification of existing sites. The establishment of a workable sample, which will reveal common dwelling types, materials, or placement is the primary research design goal.

Once the basic architectural character has been defined, the structures observed in the project area are expected to indicate the origins, geographical and ethnic, of the area's builders and inhabitants. Economic aspirations and capabilities are expected to be illustrated by such features as the choice of construction methods and materials, the relative complexity of floor plans, or the height and massing of structures. External influences, such as newspapers, agricultural journals, or the arrival of a new population via improved roads are also expected to be reflected by architectural forms and placement.

The study of the architecture in the area is expected to offer the opportunity to observe conventions in the process of alteration, modification, or total change: changing economic demands may inspire the adaptation of a dwelling for hay storage; modified aesthetics may require the addition of weatherboards to a log house. The presence of building forms foreign to the area, such as a surburban ranch house, is expected to indicate the degree to which the regional building culture has given way to the late 20th century quest for homogeneity.

SURVEY METHODOLOGY

Interviews with Local Informants

Interviews with local informants were conducted on a situational basis when people were encountered during the course of the field work. Additionally, individuals known to have a special familiarity with the local cultural resources were actively sought out and interviewed.

A standard interview format was employed for the first type of interview. Certain questions or types of questions were always asked. After the introduction by an Iroquois field worker or interviewer, the potential informant was questioned concerning his or her familiarity with the study area; for example, the interviewer would ask, "How long have you lived in this area?" or "How many years have you been farming this field?" The interviewee was further asked if he or she knew of any prehistoric or historic sites in the study area: for example, "Have you ever found or seen anyone else find Indian arrowheads or pottery in this area?" Finally, the interviewee was asked for permission to use his or her name in a final report.

Interviews with those persons chosen for their specific knowledge of the study area were more flexible and depended largely upon the amount and kind of information the interviewee could provide. Similar questions were asked while obtaining the appropriate permission to perform an archaeological investigation on privately-owned lands. This permission was obtained in accordance with state guidelines.

Field Survey Methods and Data Recording

The field survey was conducted in two phases: (1) an initial on-the-ground survey of the project area and (2) a subsequent intensive examination of the sites discovered during the initial survey.

The on-the-ground survey of the project area was accomplished by one of two methods, the selection of which was determined by the local ground surface visibility. In areas where the ground surface was readily visible, a simple walkover examination of the project area was used as the survey method. Where vegetation obscured the ground surface, shovel tests were dug at regular intervals in order to test for the presence of cultural materials. The shovel tests measured approximately 30 x 30 x 30 centimeters. They were dug with pointed spades and the dirt from each test was troweled through and examined for the presence of artifacts. Both survey methods were controlled by the use of transects which were aligned parallel to the channel or ditch centerline.

In sections of the project right-of-way where ground surface visibility was less than 50%, one transect was set between the top of the ditch bank and the base of the levee. Shovel tests were placed at 15 meter intervals along this transect. In sections with visibility greater than 50%, such as cultivated fields, one transect was placed near the top of the ditch bank and was placed near the base of the levee (in most cases this interval was less than 30 meters). Where possible, the cut bank of the ditch was also examined. In order to locate sites which might extend under the levee from outside the right-of-way, one survey transect was placed along the far edge of the levee, away from the ditch.

In addition to recording the presence of cultural sites, the degree of surface visibility along the project area was assessed and recorded. Surface visibility observations were standardized to the extent that the field survey teams estimated the degree of ground surface visibility within a one meter wide transect area. Ground visibility was recorded as falling within one of four ranges: zero to 25%, 26 to 50%, 51 to 75%, and 76 to 100%. The actual ground surface visibility conditions recorded during this project are summarized in Table 11.

A Visibility Index, designed to indicate the overall ground visibility of the entire project, is also presented in Table 11. The Visibility Index values may range from zero to 100, with the higher values indicating a greater degree of ground visibility, hence, more favorable survey conditions. In order to compute the Visibility Index, ordinal values are assigned to each range of surface visibility as follows:

Visibility Index Percent Visibility	Ordinal Value
0-25%	0
26-50%	1
51-75%	2
76-100%	3

Each ordinal value is then multiplied by the percent of the project falling within that visibility range, and these products are summed. The sum of the products divided by three is the Visibility Index.

The criteria used for site definition in this project are consistent with standards which have been developed by practitioners of cultural resource management. For prehistoric sites, any locus manifesting evidence of human activity, even a single artifact, was recorded as a site. This criterion is virtually identical with that employed in recent years by the Arkansas Archeological Survey (Dinwiddie 1978). In a recent cultural resource survey project performed in southeast Missouri by the University of Missouri, site numbers were assigned to prehistoric resources only when three or more artifacts were found (Price, Price et al. 1975).

In the present study, a historic resource was recorded as a site when an extant structure was present or when the artifact assemblage indicated that occupation or intensive extractive activity had taken place at a particular locus. These criteria exclude roads, fences, historic trash dumps, litter and isolated artifacts. No arbitrary date was employed to exclude historic resources from representation as sites.

The second phase of the field data gathering involved the intensive examination of sites which had been located during the initial on-the-ground walkover and included determining site sizes and boundaries, recording features of the local environment, sampling the artifact content of the sites, excavating test pits, and determining the relationship of the sites to the project.

Several techniques, used singly or in combination, were used to establish site sizes and boundaries. In situations where the ground surface visibility was poor, shovel test pits were dug at regular intervals along vectors from a common origin or along transects across the presumed site area, following a model presented by Chartkoff (1978). These shovel tests were identical in terms of size and technique to those dug along the survey transects. The experience of Iroquois Research Institute on other projects in the St. Francis River Basin has been that shovel testing is inferior for determining site sizes when compared to controlled surface collecting under favorable ground surface visibility conditions. Shovel testing is an effective technique for locating areas of high artifact concentration within sites, but not for delimiting site edges where artifact density is low.

The most frequently used technique for surface delineation involved the use of a regular grid system. The standard grid units employed were 10 x 10 meter squares, and the normal procedure was to collect all visible cultural material within the northeast 2 x 2 meter portion of each square and to selectively collect artifacts from the remainder of the grid unit on the basis of their diagnostic potential. The selectively sampled artifact collections were kept separate from the remainder of the artifact collections, so that data would be available for unbiased estimates of the population of certain artifact classes within each site. The grid units were placed at regular intervals across the site.

Subsurface testing was done at all of the prehistoric sites in order to determine the depth of cultural deposits and the presence of absence of any undisturbed cultural strata, as well as to gather data for interpretation of the depositional history of the sites. The subsurface testing included 1 x 1 meter and 1 x 2 meter test excavations and backhoe trenches. The standard procedure for test excavation was to remove the plowzone as a unit and to excavate in arbitrary 10 centimeter levels below the plowzone. The soil from each unit was excavated with the use of a flat edge shovel. The soil was screened through one-quarter inch hardware cloth.

Backhoe trenches were excavated at one site in the project area. This area was selected for trenching because cultural material had been located in an apparently undisturbed content during cut bank examination below 60 to 70 centimeters of spoil material. Two trenches were excavated, one 20 meters long parallel to the ditch and the other 10 meters long and perpendicular to the ditch. The excavated depth varied, but was generally about one meter. Both walls of each trench were troweled clean to examine the exposed vertical profiles, and one section of one wall was drawn in profile.

The archaeological assessment of historic sites included an inventory of the artifact content observed at the site. The presence or absence of general artifact classes and subclasses was recorded, and only those artifacts with diagnostic potential were taken from the field.

The historic artifact classification system outlined by Kenneth Lewis (1977) has been borrowed nearly intact for use in this project with some modifications and derivations incorporated from the system developed by Stanley South (1977). In the resulting system, shown in Table 3, artifact assemblages are categorized into six general artifact classes which have been designed to define functional or activity related components on an empirical basis. The original artifact

classification systems proposed by Lewis and South have been derived from pre-20th century site assemblages. Therefore, some new subclasses may have to be added to handle the large quantity of 20th century archaeological resources which have been deposited in the St. Francis River Basin.

A specialized site form was developed to record data on standing structures. This standardized architectural description was designed to be completed in the field and includes the following elements: date of construction; function of the structure; type of structure; shape and orientation; number of stories; number of bays; types of construction; types of materials; types of foundation; material, number and location of chimneys; material and shape of roof; number and construction of doors; number, type and construction of windows; physical condition; associated buildings; and other specialized architectural features. In addition to the completion of this form, any architectural structure encountered during the survey was photographed.

All artifacts removed from the field were cleaned, identified, cataloged and prepared for long-term curation. Prehistoric artifacts were sorted according to the major formal categories listed in Table 4 and the raw material classes listed in Table 5. Historic materials were cataloged according to the subclasses listed in Table 3. A unique catalog number was assigned to each artifact or group of artifacts according to the artifact type, raw material, and provenience unit. Following laboratory identification and analysis, the artifacts were placed in transparent plastic bags together with the pertinent identification and provenience data.

Survey Reliability

The Arkansas Archeological Survey has provided data for all sites in the Arkansas counties which are wholly or partially within the St. Francis River Basin. The site size data for some 1992 officially recorded prehistoric sites in Clay, Craighead, Crittenden, Cross, Greene, Lee, Mississippi, Phillips, Poinsett, and St. Francis Counties are presented in Table 6. Site size is reported as unknown for 330 sites or 16.6% of the total; for the remaining sites, size is reported by the Arkansas Archeological Survey as falling within one of six size intervals which are also indicated in Table 6. The use of this interval scale of measurement for site sizes obscures the precise size parameters of any one particular site's size, but the grouping of data permits a relatively simple calculation of the size parameters for the entire site population. The following paragraphs discuss the reliability of the field survey utilized in this study by reference to the site size parameters of the officially recorded site population in northeastern Arkansas. Although all officially recorded cultural resource data from the Missouri counties within the St. Francis River Basin have been incorporated into a research design for a predictive model for cultural resource locations (Iroquois Research Institute 1978a), the lack of site size data in the Archaeological Survey of Missouri data bank prohibits an analysis of the site size parameters for prehistoric sites in southeastern Missouri.

For the purpose of estimating the statistical reliability of the various field sampling strategies, each walkover transect is defined to be one (1.0) meter wide. This value is chosen because it closely approximates the minimum area that an archaeologist can survey while maintaining a constant bearing under diverse field conditions. The sampling fraction for spatial coverage is based on the width of

TABLE 3

ARTIFACT CLASSIFICATION FOR HISTORIC ASSEMBLAGES*

CLASS	CLASS DEFINITION	SUBCLASSES
1	Artifacts related to collection, processing and storage of subsistence foods	1a. Collection of subsistence foods subclass 1b. Processing of subsistence foods subclass 1c. Storage of subsistence foods subclass
2	Artifacts related to preparation and consumption of subsistence foods	2a. Tableware 2b. Kitchenware 2c. Ceramics 2d. Drinking containers 2e. Fireplace items 2f. Other
3	Faunal and floral remains of subsistence foods	3a. Animal bone 3b. Other
4	Tools and machinery used for solely technological activities	4a. Construction tools 4b. Miscellaneous hardware 4c. Other
5	Artifacts associated with the housing of persons and goods	5a. Architecture group 5b. Furniture group
6	Artifacts of a general nature associated with the presence of persons	6a. Clothing group 6b. Personal group 6c. Military objects 6d. Recreation group

*This classification has been adapted from Lewis (1977) and South (1977).

TABLE 4

ST. FRANCIS RIVER BASIN
ARTIFACT CODE SHEET

Bifaces

001	projectile point--complete
002	projectile point base
003	projectile point tip
004	projectile point mid-section
005	modified point--burinated
006	modified point--scraper
007	modified point--graver
008	modified point--perforator/ drill
009	point preform (cache blade)
101	other preform
011	celt
012	axe
013	adze
014	hoe
015	hoe chip (polished)
016	end scraper
017	side scraper
018	scraper--both
019	burin
020	graver
021	perforator/drill
022	spokeshave
023	chopper
024	piece esquillee
025	cylindrical microlith
026	biface other--large more than 15 mm)
027	biface other--small (less than 15 mm)
028	biface fragment

Uniface--Flake

040	graver
041	burin
042	perforator/drill
043	spokeshave
044	notched flake
045	end scraper--hafted
046	end scraper--unhafted
047	side scraper--unhafted
048	side scraper--hafted
049	scraper--both
050	chopper
051	utilized flake
052	flake tool--indeterminate

Uniface--Blade

060	unmodified blade
061	utilized blade--endscraper
062	utilized blade--side scraper
063	utilized blade--graver
064	utilized blade--knife
065	utilized blade--other
066	microblade

Cores

070	polyhedral blade core
071	microblade core
072	pebble core
073	disc core
074	quarry waste
075	exhausted core
076	core fragment
077	other core

Debitage

080	primary decortication flake
081	secondary decortication flake
082	interior flake
083	retouch flake
084	shatter

TABLE 4 (continued)

ST. FRANCIS RIVER BASIN
ARTIFACT CODE SHEET

085 core rejuvenation flake
086 other debitage

Ground Stone

090 gorget
091 bannerstone
092 boatstone
093 bead
094 figurine
095 pipe
096 discoidal
097 paint palette
098 spud
099 axe, full grooved
100 axe, 3/4 grooved
101 adze
102 celt
103 chisel
104 steatite bowl
105 abrader--notched
106 abrader--grooved
107 abrader--flat
108 indeterminate

Cobble Tools

120 edge ground cobble
121 hammerstone
122 chopper
123 anvil with U-shaped pits
124 anvil with V-shaped pits
125 mortar
126 pestle
127 pebble knife
128 other

Manuports

140 pigment
141 fossil
142 petrified wood
143 unmodified stone

Modeled Clay

150 rim sherd
151 body sherd
152 pottery disc
153 sherd abrader
154 daub
155 fired clay
156 pipe
157 bead
158 cone
159 plug
160 Poverty Point object
161 effigy
162 coil
163 squeeze
164 miscellaneous sherds

Worked Bone

170 awl
171 needle
172 fishhook

Shell

190 bead
191 bead manufacture debitage
192 gorget
193 hoe

Miscellaneous

200 fire cracked rock

Composite Tools

299 composite tool

TABLE 5

ST. FRANCIS RIVER BASIN
RAW MATERIAL CODE SHEET FOR PREHISTORIC ARTIFACTS

ROCKS	MINERALS	POTTERY AND MODELED CLAY
Igneous	**Silica Types**	
01 granite	36 chalcedony	71 shell tempered
02 rhyolite	37 oolitic chalcedony	72 sand tempered
03 basalt	38 agate	73 grog tempered
04 gabbro	39 jasper	74 untempered clay
05 obsidian	40 Crowleys Ridge chert	75 undeterminate temper
	41 Pitkin chert	
	42 Penters chert	
Sedimentary	43 chert breccia	
	44 quartz intra-clast chert	ORGANIC MATERIAL
09 shale	45 oolitic chert	
10 mudstone-claystone	46 Crescent Quarry chert	79 bone, ivory, tooth
11 conglomerate	47 Arkansas novaculite	80 wood
12 clay	48 Dover chert	81 shell
13 sandstone--silica-cemented orthoquartzite	49 Burlington chert	82 textile
14 sandstone--clay-rich arenite	50 Mill Creek chert	83 skin, hide
15 sandstone	51 Dongola chert	84 basketry
16 oolitic limestone	52 Illinois novaculite	85 cordage
17 limestone	53 quartz crystal	
18 ironstone	54 veined or milky quartz	
19 cannel coal	55 quartz	
	56 chert--other	
Metamorphic	**Non-Silica Types**	
25 schist	59 hematite	
26 micaceous schist	60 kaolinite	
27 quartzite	61 calcite crystal	
28 greenstone	62 vein calcite	
29 steatite	63 mica	
30 granite gneiss	64 catlinite	
32 silica-cemented orthoquartzite	65 petrified wood	
33 clay-rich quartz arenites	66 copper	

TABLE 6

FREQUENCY DISTRIBUTION OF PREHISTORIC SITE SIZES
IN ST. FRANCIS RIVER BASIN COUNTIES, ARKANSAS

COUNTY	SITE SIZE							TOTAL
	1-100 m^2	101-1,000 m^2	1,001-5,000 m^2	5,001-20,000 m^2	20,001-40,000 m^2	40,001 m^2 +	Unknown	
Clay	2	18	34	22	10	17	22	125
Craighead	40	98	205	134	25	37	50	589
Crittenden	4	11	14	10	3	3	0	45
Cross	2	12	55	22	12	11	0	114
Greene	7	35	86	47	13	6	63	257
Lee	2	1	13	14	5	5	40	80
Mississippi	12	21	19	43	21	29	18	163
Phillips	2	20	24	31	8	7	0	92
Poinsett	12	92	98	39	15	2	113	371
St. Francis	12	22	34	43	8	13	24	156
TOTAL	95	330	582	405	120	130	330	1,992
Percent of Total Sites	4.8	16.6	29.2	20.3	6.0	6.5	16.6	100%
Percent of Total Sites with Known Site Size	5.7	19.9	35.0	24.4	7.2	7.8	----	100%

Source: Arkansas Archeological Survey site files as of 1 June 1978.

the transects and on the intervals between transects. At 30 meter intervals, each transect therefore makes up 1/30 of the surface area which is equivalent to a sampling fraction of 3.33%. Under optimal field conditions an archaeologist can detect artifacts located up to several meters away; therefore, under these conditions the true sampling fraction exceeds 3.33%. Under less favorable field conditions where walkover transects are employed such as in a field of nearly mature soybeans, surface visibility is restricted to an area somewhat less than one meter in width. The probability that a site will be intersected during a walkover transect survey is a direct proportion of the site diameter to the interval between transects. In a situation where a field is surveyed by transects spaced at 30 meter intervals, the probability that sites of a given size will be intersected may be calculated as follows:

$$P = \frac{\text{diameter of site}}{29\ \text{m}}$$

A perfectly circular site shape is chosen since this meets the "worst case" criterion. Other site shapes have an increased probability of detection assuming random orientation. Discontinuities in a site's surface would also increase the probability of detection.

For a shovel test pit (STP), the sampling fraction is the STP's surface area divided by the surface area in which it is centered. An STP is roughly circular and measures 30 centimeters in diameter; therefore, each STP represents a surface sample measuring 707 square centimeters. Centered on a surface area measuring 30 x 30 meters, a STP is equivalent to a sampling fraction of 0.0079% which may be considered a point sample. The probability that site's surface will be intersected by STP's spaced at 30 meter intervals may be calculated as follows:

$$\frac{\text{area of site's surface}}{900\ \text{m}^2}$$

Irregularity of the site's shape or discontinuity of the site's surface does not affect this calculation. Extension of part of a site into zones defined by more than one STP does not affect the probability that it will be discovered.

Table 7 presents the size parameters associated with the site size categories used by the Arkansas Archeological Survey. Mean values for site size and diameter for each interval category have been calculated to allow mathematical analysis of the entire recorded site population. The mean values for site diameter and site size are, properly weighted, 90.7 meters and 6,458 square meters, respectively. The median values for these parameters are 71.1 meters and 3,971 square meters. The mean values are greater than the median values signifying a positively skewed distribution for the recorded site sizes. More than half the sites have sizes which are below the mean size.

Using the Arkansas Archeological Survey site size data as an estimate of the size characteristics for the population of sites in the St. Francis River Basin, the reliability of various transect and shovel test survey intervals may be calculated, using the previous probability formulas. Table 8 presents a mathematical derivation of the reliability of a transect survey using 30 meter intervals. Using

TABLE 7

SITE SIZE CATEGORY PARAMETERS
FOR ST. FRANCIS RIVER BASIN COUNTIES, ARKANSAS

SIZE CATEGORY	SIZE RANGE	MEAN SIZE	DIAMETER RANGE	MEAN DIAMETER	NUMBER OF SITES
0	1-100 m^2	50.5 m^2	1-11.3 m	8.0 m	95
1	101-1,000 m^2	550.5 m^2	11.3-35.7 m	26.5 m	330
2	1,001-5,000 m^2	3,000.5 m^2	35.7-79.8 m	61.8 m	582
3	5,001-20,000 m^2	12,500 m^2	79.8-159.6 m	126.2 m	405
4	20,001-40,000 m^2	30,001 m^2	159.6-225.7 m	195.4 m	120
5	40,001 m^2+	40,001 m^2+	226 m +	226 m +	130
TOTAL					1,662
Mean site size=		6,458 m^2	Mean site diameter=	90.7 m	
Median site size=		3,971 m^2	Median site diameter=	71.1 m	

TABLE 8

RELIABILITY OF TRANSECT SURVEY AT 30 METER INTERVALS
FOR DISCOVERY OF SITES IN ST. FRANCIS RIVER BASIN, ARKANSAS

SIZE CATEGORY	NUMBER OF SITES (f)	MEAN DIAMETER	p_d	$n_d = p_d \times f$
0	95	8.0 m	0.28	27
1	330	26.5 m	0.91	301
2	582	61.8 m	1.00	582
3	405	126.2 m	1.00	405
4	120	195.4 m	1.00	120
5	130	226.0 m	1.00	130
TOTAL	1,662			1,565

TABLE 9

RELIABILITY OF SHOVEL TEST PIT SURVEY AT 30 METER INTERVALS FOR DISCOVERY OF SITES IN ST. FRANCIS RIVER BASIN, ARKANSAS

SIZE CATEGORY	NUMBER OF SITES (f)	MEAN SIZE	P_d	$n_d = P_d \times f$
0	95	50.5 m^2	0.06	6
1	330	550.5 m^2	0.61	201
2	582	3,000.5 m^2	1.00	582
3	405	12,500 m^2	1.00	405
4	120	30,000 m^2	1.00	120
5	130	40,001 m^2 +	1.00	130
TOTAL	1,662			1,444

the mean diameter values calculated for each site size category, the probability (pd) that sites of that size will be discovered is calculated by the initial formula given above. This probability value is then multiplied by the frequency of sites recorded in that size category (f) to yield the number of sites that will be found. The number of sites that are expected (nd) are then summed. Virtually all sites in size categories 2, 3, 4, and 5 (larger than 57.8 meters in diameter) will be intersected during this type of survey. Approximately 28% of the smallest sites (size category 0) will also be found as well as approximately 91% of the sites with a diameter between 11.3 and 35.7 meters.

Finally, a summation of the number of sites expected to be intersected in each size category (1565) is divided by the total number of sites (1662) and converted to percentage notation. A total of 94% of the sites would be intersected utilizing transects spaced at 30 meter intervals.

The reliability of a shovel test pit survey utilizing a 30 meter interval is similarly outlined in Table 9. Using the mean site size values calculated for each size category, the probabilities that sites of that size will be intersected is calculated by the second formula. Approximately 86.8% of all sites should be intersected by an STP survey utilizing 30 meter intervals. Approximately six percent of the smallest sites (less than 100 square meters) will be sampled.

The probability that sites in a particular survey area will be discovered is dependent on many factors besides the metric intervals between walkover transects or shovel tests. Field conditions such as vegetative cover, ground surface erosion, soil moisture, and soil color may significantly affect the visibility of surficial artifacts; the experience, eyesight, alertness, and fatigue of the observers also affect the results of an inventory survey. Finally, complete burial of a site ensures that it will not be discovered during a surface walkover survey.

The reliability of various survey techniques may be mathematically approximated for a particular study area, given: (1) a reliable estimate of the site size distribution for the population, (2) a willingness to entertain an assumption of uniform field conditions, and (3) information regarding the potential for discovery of deeply buried sites.

In the preceding discussion, the complete site inventories for Arkansas counties in the St. Francis River Basin were chosen as an estimate of the site size parameters for the regional site population. While these records represent the largest available data base, the scientific reliability of the AAS data is extremely variable. The AAS files have been strengthened in recent years by the results of several systematic surveys; however, a large percentage of the sites recorded by the AAS have been reported as a result of unsystematic survey activity. Regarding the effects of variable field conditions, there is no published discussion of the effects of various field conditions on the rate of site discovery. Also, there has been no systematic project directed toward ascertaining the extent of deeply buried cultural sites in the St. Francis River Basin, although a proposed research program for locating deeply buried Paleo-Indian sites in the Cache River Basin has been published (R. Taylor 1975).

Although it may be desirable to establish some criterion of adequacy for cultural resource inventory surveys, such as 90 or 95% reliability, there is a more immediate need to obtain reliable estimates of the site size distribution in a given area. The data available from the Arkansas Archeological Survey does indicate that the site sizes in the St. Francis River Basin are positively skewed; that is, there are many more small sites than large sites. The labor cost for a transect survey with 95% reliability is 31% higher than that required for 90% level of reliability, and the cost differential between 90% and 95% reliability in an STP survey is approximately 40%. The practical limitations of available funds under which all CRM projects operate must be balanced against the desirability of locating high percentages of small sites.

Locational Control

Locational control of archaeological data is essential in order to insure the best possible management of identified cultural resources. Specific project impacts can be acurately determined only when the relation of a project and its features to the cultural resources is strictly defined. These quantifications and the subsequent determinations are necessary so that the best overall compromises between the design of a project and the preservation or mitigation of the resources can be developed.

From the outset, the effort to obtain accurate locational control for the Component Investigation Area studies encountered several limitations. Horizontal control in the St. Francis project area is sparse. Although the U.S. Army Corps of Engineers topographic quadrangle maps show benchmarks and control points every few miles, these are usually found on the major roads and railroads. Their proximity to the areas encompassed by the component investigations is often measured in miles. In addition, tree lines and woods limits the useful range of triangulating with a theodolite. Thus, relating the locations of the identified cultural resources to the existing benchmarks and control points necessitates a very slow and expensive process.

A more serious limitation is the actual status of the control monuments. The majority of these have been destroyed, overgrown, or otherwise obscured. A large time investment is required simply to locate many of them even after the background data describing their locations have been obtained from the appropriate sources. The investment of time and manpower needed to obtain horizontal control for the Component Investigation Area studies by traditional methods is seldom economically justifiable.

With long range triangulation and distance measuring techniques effectively removed as viable approaches to insuring locational control, other methods had to be developed for the specific archaeological surveys. To this end, the Corps of Engineers provided project design maps of the component areas that had been produced from aerial photographs. These construction drawings were used by the Iroquois field crews to identify short range landmarks such as houses, tree lines, and roads. Since geodetic coordinate grids were also put on these project maps, specific points could be transferred to the topographic quadrangle maps and thereby be related to their UTM coordinates. By using these maps, then, locational control became a matter of orienting site datums to the landmarks that were visible and locatable on the project design maps.

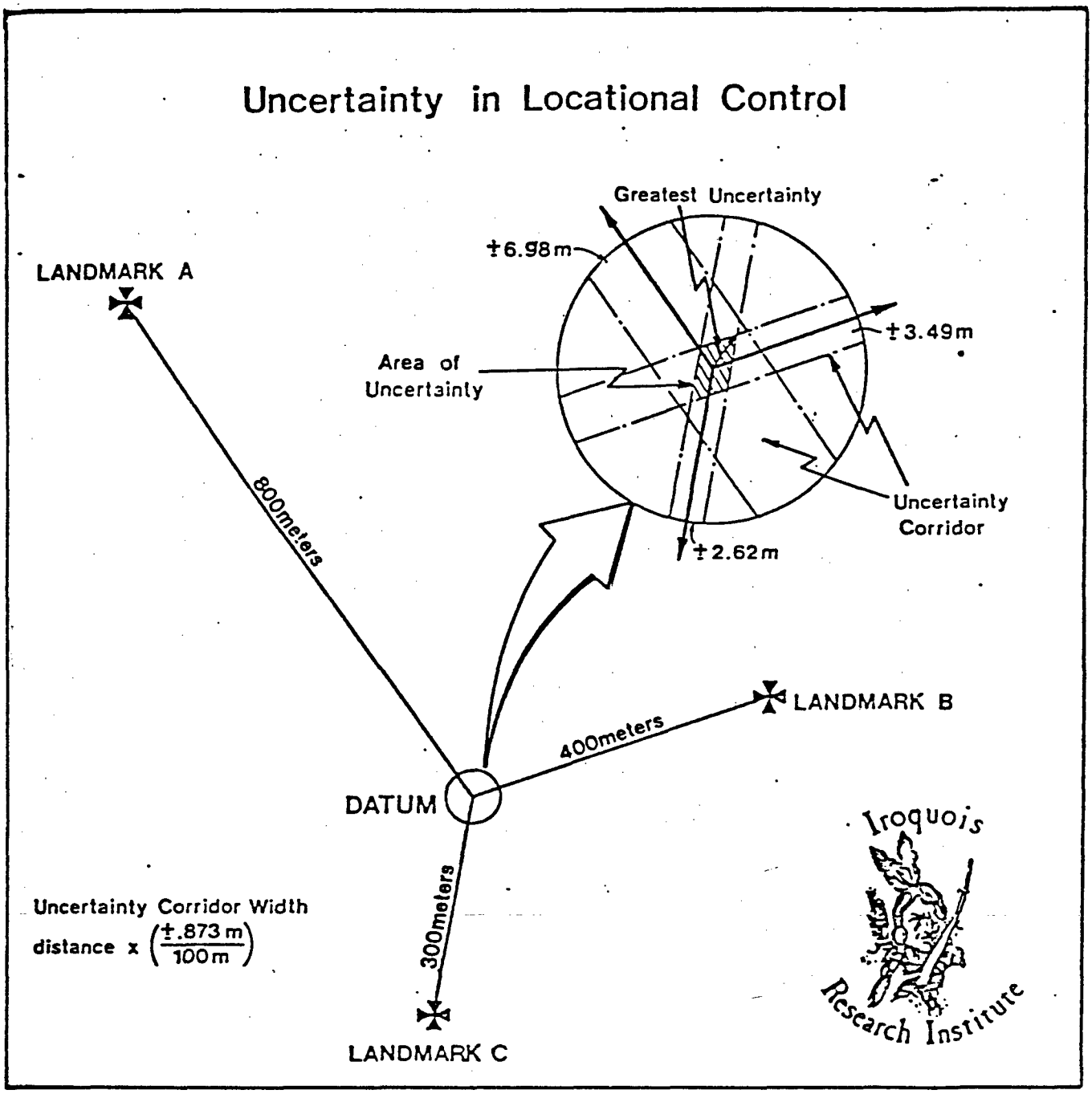


Figure 2. This figure shows how the uncertainty can be quantified. 'Uncertainty corridors' have been drawn in the inset. The shaded area, the intersection of all these corridors, is the area of uncertainty. The greatest uncertainty in this example would be about 5 meters. All of these calculations assumed use of a brunton compass with ± .5 degree accuracy. Knowing the uncertainty of the coordinate locations facilitates locating the site in the future.

The principle for using angles to determine a location is simple. The angles measured between three landmarks (points) from a common point will define that point uniquely. If a compass is used, two landmarks are sufficient since the compass bearing essentially replaces the third point. However, using three points is preferred since any offset declination error and most other 'distortions' - for example, the magnetic effects of belt buckles and watches - can be eliminated. A Brunton compass set on a tripod has sufficient accuracy when nearby landmarks are used. The surveyor's field task is greatly simplified since he has only to find a site datum, set the compass and tripod over it, measure the bearings to the three nearby landmarks, and record the data. A survey crew is not needed although an aide may be used on occasion to mark a road intersection or similar feature.

Once the data have been obtained in the field, they can be processed in the field office within a day. The bearings to the landmarks are drawn onto graph paper as geometric rays. The graphical axes are used as the compass directions so the graphical solution can be oriented to the project design map's geodetic grid. The graphical solution is then laid over the map. When the rays have been lined up over the landmarks and checked with parallel grids, the location of the point has been found and can be accurately plotted.

When dealing with angles for locational control, the uncertainty or range of error is a function of the accuracy of the angle measurements coupled with the distance to the landmarks. The Brunton compass used by Iroquois can be read accurately to the nearest degree. This gives an uncertainty of $\pm$0.873 meters per 100 meters of distance from the datum. If the uncertainty of each measurement is assumed to be a 'corridor', the total locational uncertainty can be graphically represented by the intersection of the three individual uncertainties (Figure 2).

There are also uncertainties in the landmark images on the project design maps that need to be taken into account. With an engineer's rule that has 1/50 of an inch resolution, there is a graphical uncertainty of $\pm$1.27 meters at the 1:5000 scale. However, a landmark's image must be very sharp for this accuracy. Therefore, when tree lines or woods have to be used, larger errors are to be expected. The project maps may also have some unquantified distortion resulting from the production and reproduction processes.

The project design maps contain only geodetic coordinate grids on them. Consequently, the most accurate coordinates obtainable are geodetic. In order to calculate UTM coordinates, the quadrangle maps must be utilized. To do this, datum points are plotted on the quadrangle maps by their geodetic coordinates. These coordinates are then read off in the UTM system. This system is, however, filled with uncertainty. When 15 minute quadrangle maps are used, the final UTM result could have an uncertainty of up to 50 meters. The 7.5 minute quadrangle maps are more accurate with an uncertainty of approximately 20 meters. The vast majority of topographic quadrangle maps available for the St. Francis Basin are, however, of the 15 minutes series.

RESULTS

Overview

A total of four sites were inventoried during the field investigation of the Below Locust Creek Landside Ditch Cleanout project area. Table 10 summarizes the cultural resource inventory and indicates whether each site has a prehistoric, historic, or architectural component. The distinction between historic and architectural components is based upon the presence or absence of standing structures. If a site had a structure at the time of the field investigation, it was considered an architectural site; those sites that contained material of Euro-American origin in archaeological context were considered historic. Thus the term "historic" does not necessarily imply a great age.

Design specifications contain a proviso that the two architectural site areas be avoided during construction. In addition, the historic component of Site LCX#3 lies outside of the right-of-way and consequently will not be effected by construction related impacts.

Field conditions in the project area were less than optimum for the discovery of sites. The field survey and testing phase of the project was conducted between May 5 and May 20, 1980. Excessive ground surface cover necessitated shovel testing 57.9% of the project area with only 23.4% of the right-of-way being conducive to pedestrian survey. Approximately, 18.7% of the project area was unsurveyable due to the presence of permanent wetlands or standing water.

A summary of the surface visibility conditions recorded during the field survey is presented in Table 11. Ground surface visibility was estimated with reference to a hypothetical one meter wide transect centered about each field crew member. Approximately 76.6% of the area surveyed had ground surface visibility less than 50%.

The site occurrence rates according to physiographic zones are summarized in Table 12. Similar rates of 10.6 sites per square miles were calculated for both archaeological and architectural sites in the area surveyed. An occurrence rate of 5.3 sites per square mile was calculated for historic sites. The entire project is within the Braided Terrace Physiographic Zone with 80.1% of the surveyed area with the Relict Gathering Channel subdivision of the Braided Terrace. The low site frequencies and the small size of the surveyed area limit the degree of statistical relationship between site occurrence and physiographic zones which can be determined.

The site occurrence rates according to soil series for the Below Locust Creek Landside Ditch project area are presented in Table 13. All of the inventoried cultural resources occur on the somewhat poorly drained soils that characterize most of the project area. Calculated rates of occurrence for the project area are not statistically significant due to the limited area surveyed and low site frequencies. However, these survey data may be analyzed together with the results of other survey projects to develop a predictive model of cultural site locations in the St. Francis Basin.

TABLE 10

SUMMARY OF CULTURAL RESOURCES

STATE NUMBER	FIELD NUMBER	COMPONENTS
	LCX #1	A
	LCX #2	A
	LCX #3	P,H
	LCX #4	P

P = Prehistoric A = Architectural H = Historic

Total prehistoric components:	2
Total architectural components:	2
Total historic components	1
Total number of sites:	4

TABLE 11

SURFACE VISIBILITY CONDITIONS RECORDED AT THE BELOW

LOCUST CREEK LANDSIDE DITCH CLEANOUT PROJECT

PERCENT VISIBILITY	ACREAGE	PERCENT OF AREA EXAMINED*
0 - 25%	68.9	57.1
26 - 50%	23.5	19.5
51 - 75%	-	-
76 - 100%	28.2	23.4
TOTAL	120.6	100%
VISIBILITY INDEX: 29.9		

* Approximately 18.7 percent (22.6 acres) of the project right-of-way was not surveyable because of standing water.

TABLE 12

CULTURAL RESOURCE SITE OCCURRENCE RATES

ACCORDING TO PHYSIOGRAPHIC CATEGORIES

BELOW LOCUST CREEK LANDSIDE DITCH CLEANOUT PROJECT AREA

PHYSIOGRAPHIC CATEGORY	SITES PER SQUARE MILE			
	ACREAGE	PREHISTORIC (n = 2)	ARCHITECTURAL (n = 2)	HISTORIC (n = 1)
Braided Terrace-Relict Gathering Channels	96.5	13.3	6.6	6.6
Braided Terrace-Relict Interfluve	23.9	0	26.8	0
Braided Terrace-Combined Subdivisions	120.4	10.6	10.6	5.3

TABLE 13

CULTURAL RESOURCE SITE OCCURENCE RATES

ACCORDING TO LOCAL SOIL ENVIRONMENTS,

BELOW LOCUST CREEK LANDSIDE DITCH CLEANOUT PROJECT AREA

SOIL ENVIRONMENT	ACREAGE	SITES PER SQUARE MILE		
		PREHISTORIC (n = 2)	ARCHITECTURAL (n = 2)	HISTORIC (n = 1)
Frequently Flooded Soils of the Sharkey Series	9.7	0	0	0
Poorly Drained Clay Loam in the Fountain Series	0.3	0	0	0
Somewhat Poorly Drained Fine Sandy Loam of the Askew Series	1.7	753.0	0	376.5
Somewhat Poorly Drained Very Fine Sandy Loam in the Commerce Series	6.1	0	0	0
Somewhat Poorly Drained Fine Sandy Loam of the Dundee Series	7.6	0	84.2	0
Poorly Drained Fine Sandy Loam of the Mhoon Series	7.0	0	0	0
Exceedingly Well Drained Fine Sandy Loam of the Beulah Series	2.2	0	0	0
Poorly Drained Clay in the Sharkey Series	86.0	0	7.4	0
All Soil Environments Combined	120.8	10.6	10.6	5.3

The sites inventoried during the field survey of the project area are described in the following pages. Specific details of individual site locations are not included in these descriptions in order to protect the resources from vandalism, looting and pothunting. Table 10 lists the inventoried sites by field identification numbers. Corresponding state numbers have not yet been assigned. Each field identification number consists of two parts, an alphabetic prefix "LCX" which designates the Below Locust Creek Landside Ditch Cleanout project and a numeric suffix unique to the site. The official state numbers follow the Smithsonian trinomial numbering system. According to this system, each site number begins with a numeric prefix ("3" for Arkansas), followed by an alphabetic county code ("CG" for Craighead County or "GE" for Greene County) an a number which designates a unique site in that particular state and county.

Two sites had been previously recorded near the project area, 3CG311 and 3GE198. Neither of these sites were located.

Site Descriptions

LCX #1

This architectural site is located on the right descending bank of the Locust Creek Landside Ditch. It is located between the west side of Locust Creek Ditch and the adjacent levee. It was discovered during walkover transect surveys of the area. The site consists of five living structures, four storage sheds, and one outhouse.

Structure 1 was made from an old school bus. The wheels and axles have been removed and the bus rests on four concrete blocks. The engine compartment has been removed and the firewall covered with a sheet of metal bolted to the bus. The bus is longitudinally oriented in a north-south direction, and is used as a recreational structure. The bus was converted into a recreation structure in 1967. The interior seats have been removed and replaced with a stove, couch, and wooden chest of drawers.

Structure 2A was made from an old school bus. The bus is longitudinally oriented in a east-west direction. It is presently used as a storage structure. The driver's seat and front two seats remain in the bus, all other seats have been removed. The wheels and axles have been removed and the bus is sitting flat on the ground. The bus was converted in 1972.

Structure 2B is directly adjacent (north side) to structure 2A. It is being used as a dwelling structure. The structure is an aluminum sided house trailer with the east end attached to an aluminum sided, light wood framed shed. The structure has no electrical connections nor sewage connections. It was built in two sections during 1972 and 1978 respectively.

Structure 3 was built in 1975. It is rectangular in shape and used as a tool and storage shed. It is made of wood frame supports covered by horizontal scrap boards. It is single storied and has an aluminum door.

Structure 4 is a converted school bus. Since 1975 it has been used as a dwelling structure. The longitudinal direction is north-south. The wheels and axles have been removed and the bus sits flat on the ground. Mr. Cleo Walker resides in this structure.

Structure 5 was built in 1962. It is a single seat outhouse. Is was constructed with a wood frame and then covered with corrugated aluminum siding. The door is made of horizontal wood planking with an angled brace.

Structure 6 was built in 1962. It is a workshop-storage shed combination. It is constucted of light wood (scrap) framing covered with corrugated aluminum siding. There is no foundation. The front has a single gable across the entire front of the structure.

Structure 7 was built in 1977. This is a mobile home that is presently in use as a dwelling structure. It has no foundation, sitting directly on the ground. This structure has indoor plumbing and electricity.

Structure 8 was modified in 1962. This is a school bus that has been converted into a dwelling structure. Wheels and axles have been removed and the bus is sitting flat on the ground surface. Both longitudinal sides of the bus has been modified by the addition of wooden framed, corrugated aluminum sided lateral extensions. The roof is single gabled. A metal stove pipe chimney extends out of the east side of the structure. This structure has indoor plumbing and electricity.

Structure 10A was constructed in 1969. This is a dwelling structure, roughly rectangular in shape, made of vertical planking that was covered with tarpaper. The front porch is made of light wood framing covered with aluminum siding. The structure sits on a concrete block foundation. It has a block (bottom 1/4 portion) and brick (top 3/4 portion) chimney in the center of the north wall. The roof is gable/shed shaped and is covered with aluminum siding. The structure has indoor plumbing and electricity.

Structure 10B was constructed in 1969. This is a rectangular, prefabricated aluminum storage building. There is no foundation. It has a gable roof. The only door is made of aluminum and is in the south wall. This structure is adjacent to and north of structure 10A.

A structure(s) is not noted at this location on the 1956 Leachville, Arkansas 15' quadrangle. However, buildings are indicated at the site on the 1977 Corps of Engineers project map Number 41L/58(2). Drawings and photographs of the structures were made.

LCX #2

This architectural site is located on the right descending bank of Locust Creek Ditch, between the ditch and the adjacent levee. It was discovered during walkover transect surveys of the area. The site consists of one house structure associated with three subsidiary structures.

Structure 1 is a single story abandoned dwelling. It was erected in 1967. Presently it is being used as a childrens playhouse. It is single gabled, has no foundation, and is constructed of wood and tarpaper. The structure is plank framed, walls are covered with horizontal and vertical planking. The roof is plank framed and covered with tarpaper.

Structure 2 is an abandoned storage shed that was constructed in 1965. This building is associated with structure 1. The roof is shed shaped. Both the roof and walls are constructed of a light wood frame which is covered with aluminum siding. A door is located in the west wall. Windows are in the north and south walls.

Structure 3 is an abandoned storage shed that is quite similar to structure 2. It also was built in 1965. The building has no foundation. The roof is shed shaped, and is constructed of a light wood frame which is covered with aluminum siding. The walls are of the same construction materials. There are no windows in this building.

Structure 4 is an abandoned dwelling that was constructed in 1965. It is a single storied building with a broken gable style roof. A brick chimney is located in the center of the west wall. A porch is located on the west side of the north wall. The building is supported by wood pilings and concrete blocks. The roof is constructed of wood planking and covered with paper. The remainder of the structure is constructed of horizontal wood planking which is covered by tarpaper. This building is associated with structures 1, 2, and 3. All walls contain windows, but only the north and south walls have doors.

A structure(s) is not noted at this location on the 1956 Leachville, Arkansas 15' quadrangle. However, buildings are indicated at the site on the 1977 Corps of Engineers project map Number 41L/58(2). Drawings and photographs of the structures were made.

LCX #3

This site is located on the left descending bank of the Below Locust Creek Landside Ditch. It was discovered during walkover transect surveys through a cultivated field. A levee runs parallel to the ditch and divides the site area. Cultural material was observed on both the east and west sides of the levee with both prehistoric and historic components identified for the site.

After completing the walkover survey, a crew returned to the site and established a grid of 10 x 10 meter squares. Approximately 2,200 square meters were examined by systematic and selective collection procedures. The grid extended across the levee but no grid units were examined on the levee. Based on the results of the surface collections and controlled observations, the total size of the site is estimated to be 200,300 square meters of which 3,600 square meters is within that portion of the right-of-way which is bounded by the top bank of the ditch and inside edge of the levee. Approximately 4,500 square meters of the site lies under the levee adjacent to Locust Creek Ditch with the remainder of the site area situated outside of levee and/or right-of-way bounds.

To assess the subsurface extent and integrity of the site, test excavations were placed in the areas of the highest observed surficial artifact concentration. Two adjacent 1 x 1 meter units, 40N, 31E and 41N, 31E, were excavated on the west side of the levee approximately 15 meters from the top of the ditch bank. These units were excavated to a depth of 118 centimeters. Artifacts were recovered from the deepest levels of the test pit; however, the excavation was terminated because of safety regulations prohibiting excavation below a depth of four feet. Another 1 x 1 meter test pit 30S, 121E was excavated on the west side of the levee to a depth of 85 centimeters. This test pit was terminated after two consecutive sterile 10 centimeter levels were excavated.

Six major strata were distinguished in the vertical profile of test pits 40N, 31E and 41N, 31E (Figure 3). The soil profile of the upper part of this excavation (Strata I and II) appears to have been disturbed by the excavation of Locust Creek Landside Ditch and the construction of the levee. Strata I and II were composed of dark yellowish brown (10YR 4/4, 10YR 3/4, and 10YR 4/6, 10YR 3/6), light yellowish brown (10YR 6/4), and yellowish brown (10YR 5/6) loamy sands and sands. Substrata II, IIA, and IIB were characterized by numerous indications of disturbance such as discontinuous lenses of slightly differently colored sediments, indistinct and distinct contorted and discontinuous beds and laminations. Dark grayish brown (10YR 4/2) clay clods are present within substratum IIA and black (10YR 2/1) manganese nodules are present in substratum IIB.

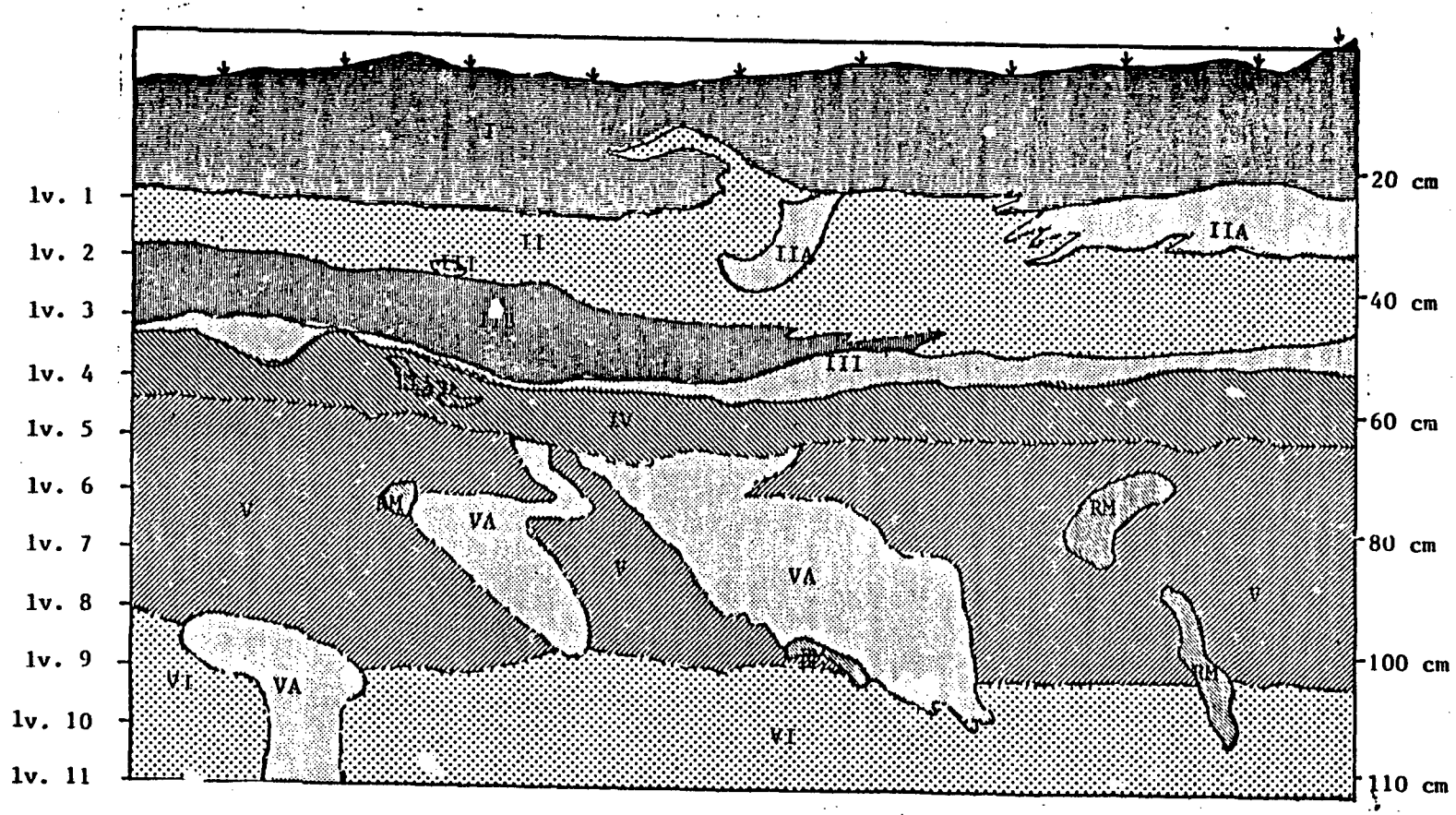
The excavation of Stratum III marked the beginning of the apparently undisturbed strata. This stratum was made up of dark grayish brown (10YR 4/2) to dark brown loam and sandy clay. It was massive and structureless. Stratum IV was a dark brown (10YR 4/3) massive, structureless loamy sand. Substratum V, a dark yellowish brown (10YR 4/4) sand, had many large strong brown (7.5YR 4/6) sand pockets and contained many krotovina of numerous sizes. Stratum VA was a yellowish brown (10YR 5/6) sand with a few medium, elongate, strong brown (7.5YR 5/6) mottles. Stratum VI, a massive, structureless yellowish brown (10YR 5/8) sand with many large yellowish brown mottles, was the last stratum (10YR 5/6) to be defined in the test pit.

A less disturbed stratigraphy was revealed for the site area on the west side of the levee by the results of test pit 30S, 121E (Figure 4). The plow zone (Stratum I) was composed of a very dark brown (10YR 2/2) to dark yellowish brown (10YR 3/6) medium grained and well-sorted loamy sand. This unit was massive and structureless. Stratum II was a dark yellowish brown (10YR 3/4) massive and structureless sand. This medium grained, well-sorted unit also contained indistinct krotovina, iron stains and manganese stains. Stratum IIA consists of dark yellowish brown (10YR 4/6) massive and structureless sand which fills a large krotovina.

The sand in this unit is medium grained and well-sorted. The lowest stratum, Stratum III was a dark yellowish brown (10YR 3/6) massive and structureless sand. It contains abundant black (10YR 2/1) manganese nodules and stains. Downward bifurcating 2-3 centimeter wide krotovina filled with yellowish brown (10YR 5/4) sand penetrate the entire stratum. All of the sediment in Stratum III is well-sorted medium grained sand.

FIGURE 3

EAST WALL PROFILE AT TEST PIT 41N,31E, LCX#3



I Plowzone. Dark yellowish brown, 10YR 4/4*, loamy sand.

II Dark yellowish brown, 10YR 3/4, loamy sand.

IIA Dark yellowish brown, 10YR 4/6, sand.

IIB Dark yellowish brown, 10YR 4/4, sand with manganese concretions.

III Dark greyish brown, 10YR 4/2 to dark brown, 10YR 4/3, loam and sandy clay.

IV Dark brown, 10YR 4/3, loamy sand.

V Dark yellowish brown, 10YR 4/4, sand. Abundant krotovina.

VA Yellowish brown, 10YR 5/6, sand.

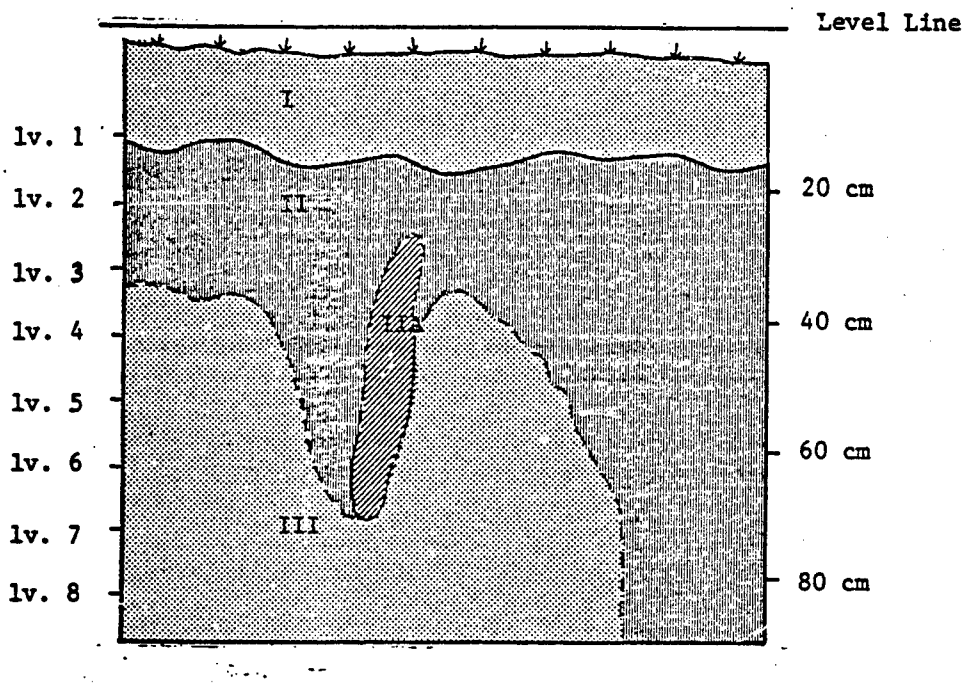
VI Yellowish brown, 10YR 5/8, sand with yellowish brown, 10 YR 5/6 mottles.

RM (root mold) Large Krotovina filled with dark yellowish brown, 10YR 4/6, sand.

*Source: Munsell Color (1975).

FIGURE 4

WEST WALL PROFILE AT
TEST PIT 30S,121E, LCX#3



I Plowzone. Very dark brown, 10YR 2/2* and dark yellowish brown, 10YR 3/6, loamy sand.

II Dark yellowish brown, 10YR 3/4, sand. Krotovina, iron and manganese stains present.

IIA Dark yellowish brown, 10YR 4/6, sand.

III Dark yellowish brown, 10YR 3/6, sand with black, 10YR 2/1 manganese nodules.

*Source: Munsell Color (1975).

Tables 14, 15, 16, and 17 summarize the materials recovered from the two adjacent excavation units (40N, 31E, 41N, 31E) and from unit 30S, 121E. The majority of the excavated material from combined unit 41N, 31E consists of prehistoric lithics. Barnes ceramics were recovered through Level 8, (78-88 cm). Prehistoric lithics were present throughout the unit. The disturbance of the upper strata, as indicated by the profile, is substantiated by the recovery of two rusted metal fragments from Level 5 of the unit. Unit 30S, 121E was placed west of the levee in a relatively undisturbed locale. The majority the artifact collection from the unit was prehistoric lithics with lithic material being recovered through Level 6 (55-65 cm). Barnes Plain sherds were recovered through Level 3 (25-35 cm) of the unit.

The prehistoric assemblage from LCX #3 consists of both lithic and ceramic remains. A total of 129 lithic items were recovered and include five projectile points, two bifaces, one drill, three utilized flakes, four cores, one blade, and 113 pieces of flaking debris.

The Lake Archaic Period is the apparent cultural affiliation of two of the projectile points recovered. A crudely made large stemmed point of Crowleys Ridge chert is roughly similar in morphological features to the Delhi point type (Perino 1971). The other point exhibits a flaring stem, is made from an unidentified chert, and resembles the Epps point type (Ibid.)

Two expanded stem projectile points were recovered and are like the Bakers Creek point type (Smith 1979; Perino 1971). Both are made from unidentified cherts. The Bakers Creek point type is affiliated with the Middle and Late Woodland Periods. A small triangular point made from Crowleys Ridge chert was recovered from the surface. It is similar to the Fresno point type (Bell 1960) which is associated with the Mississippian Period.

The two bifaces are both made from Crowleys Ridge chert. One is laurel leaf-shaped in outline and appears to be a preform. The other is thick, crudely flaked, and exhibits cortex on the face. It may have been used in a scraping manner.

The distal end of a drill made from Crowleys Ridge chert was recovered from subsurface investigations. Three items that exhibit attrition scarring resulting from utilization were recovered. Two are primary decortication flakes and the other is a decortication blade. All are made from Crowleys Ridge chert.

There were four cores recovered from the site. Two appear to be shaped. One is made from an unidentified chert and the other from Crowleys Ridge chert. The others are small exhausted cores, and both are made from Crowleys Ridge chert.

The remainder of the lithic assemblage is composed of an unutilized blade of Crowleys Ridge chert and 113 pieces of flaking debris. Fifty-six are primary decortication flakes, 32 are interior flakes, and 16 are retouch flakes. All are made from Crowleys Ridge chert except one interior flake which is made from orthoquartzite.

TABLE 14

STRATIGRAPHIC SUMMARY OF TEST PIT 30S, 121E

SITE LCX #3

LEVEL	DEPTH BELOW SURFACE	EXCAVATION DIMENSIONS	MATERIALS RECOVERED
1	0-15 cm	1 x 1 m	1 Barnes Plain sherd 7 debitage
2	15-25 cm	1 x 1 m	7 Barnes Plain sherds 20 debitage
3	25-35 cm	1 x 1 m	1 Barnes Plain sherd 1 sand-tempered sherd 8 debitage 1 miscellaneous
4	35-45 cm	1 x 1 m	8 debitage
5	45-55 cm	1 x 1 m	4 debitage
6	55-65 cm	1 x 1 m	2 debitage
7	65-75 cm	1 x 1 m	sterile
8	75-85 cm	1 x 1 m	sterile

TABLE 15

STRATIGRAPHIC SUMMARY OF TEST PIT 40N, 31E

SITE LCX #3

LEVEL	DEPTH BELOW SURFACE	EXCAVATION DIMENSIONS	MATERIALS RECOVERED
1	0-18 cm	1 x 1 m	2 bifaces 4 debitage 6 miscellaneous 2 rusted metal fragments
2	18-28 cm	1 x 1 m	4 debitage 1 miscellaneous 1 rusted steel rim fragment
3	28-38 cm	1 x 1 m	1 miscellaneous
4	38-48 cm	1 x 1 m	1 blade 1 debitage
5	48-58 cm	1 x 1 m	2 rusted metal fragments
6	58-68 cm	1 x 1 m	1 Barnes Plain sherd 3 debitage

TABLE 16

STRATIGRAPHIC SUMMARY OF TEST PIT 41N, 31E

SITE LCX #3

LEVEL	DEPTH BELOW SURFACE	EXCAVATION DIMENSIONS	MATERIALS RECOVERED
1	0-18 cm	1 x 1 m	1 biface 7 debitage 2 miscellaneous
2	18-28 cm	1 x 1 m	sterile
3	28-38 cm	1 x 1 m	3 debitage 1 miscellaneous
4	38-48 cm	1 x 1 m	1 flake tool 1 blade 7 debitage 1 miscellaneous
5	48-58 cm	1 x 1 m	1 debitage 1 miscellaneous
6	58-68 cm	1 x 1 m	2 Barnes Plain sherds 1 core 2 debitage

TABLE 17

STRATIGRAPHIC SUMMARY OF TEST PIT 41N, 31E

SITE LCX #3

LEVEL	DEPTH BELOW SURFACE	EXCAVATIONS DIMENSIONS	MATERIALS RECOVERED
7	68-78 cm	1 x 2 m	2 Barnes Cordmarked sherds 1 Barnes Plain sherd 8 debitage 2 miscellaneous
8	78-88	1 x 2 m	1 Barnes Plain sherd 1 biface 1 core 10 debitage 2 miscellaneous
9	88-98 cm	1 x 2 m	2 debitage
10	98-108 cm	1 x 2 m	8 debitage 2 miscellaneous
11	108-118 cm	1 x 2 m	4 debitage 2 miscellaneous

The ceramic assemblage of LCX #3 consists solely of sand tempered sherds. Fifteen are body sherds, one is a rim sherd, and one is eroded and is inventoried as an indeterminate sherd. Two sherds are classified as Barnes Cordmarked ceramics with the remainder of the identified collection identified as Barnes Plain sherds. The Barnes type is associated with the Baytown or the Late Woodland Periods.

Unmodified rocks, totaling 26, were collected during the investigations at LCX #3. These are not definitely associated with any cultural components at the site.

The major prehistoric occupation of this site, as indicated by the presence of Barnes ceramics and the identification of diagnostic lithics occurred during the upper range of the Woodland Period. Other possible periods of occupation that are indicated from diagnostic artifacts present at the site include the Late Archaic (Poverty Point), Middle Woodland, and Mississippian. Surface indications of the prehistoric occupation are sparse and widely scattered. However, subsurface investigation revealed a much greater concentration of material relative to surficial artifact density. If this subsurface artifact concentration extends under the entire indicated surface site peripheries then possibly a permanent occupation site such as a village is present.

The historic assemblage from the site includes both domestically and architecturally related artifactural materials. Artifacts recovered from the site in the domestic artifact sub-category include, bottle glass, milk glass, ceramics (whiteware, porcelain, and patterned), a bottle cap, a metal rim fragment, a butter knife blade, a plastic container base, and a fork tine. Architectural artifact sub-category items inventoried from the site include a brick fragment, window glass, wire nails, a brass hinge, concrete fragments, a metal plumbing u-joint, and a piece of copper tubing. Several miscellaneous metal fragments and pieces of glass slag were also inventoried. A structure is not indicated at this location on project blueline map 41L/59(3). However, a structure is shown for this location on the 1956 Leachville, Ark-Mo. 15' quadrangle. Thus, a historic component is established for LCX #3 based on the amount and kind of cultural materials present and a review of cartographic evidence.

LCX #4

This prehistoric site was discovered while doing a cut bank examination of the left descending bank of the Locust Creek Landside Ditch. Several possible lithic artifacts were found in the exposed bank. After preliminary examination of the site, a datum was placed on the topbank of the ditch for later site location and examination.

When the site was revisited for verification, two backhoe trenches were excavated. Backhoe trenches were done in lieu of other verification procedures because the cultural material observed by the survey crew was located 110-120 centimeters below ground surface.

Five strata were identified in the vertical profile of the backhoe trench. Stratum I was a light yellowish brown (10YR 6/4) sandy silt with many small roots throughout it. Stratum II consisted of a brown-dark brown (10YR 4/3) sandy clay mottled with pale brown (10YR 6/3) sandy silt. Some iron oxide

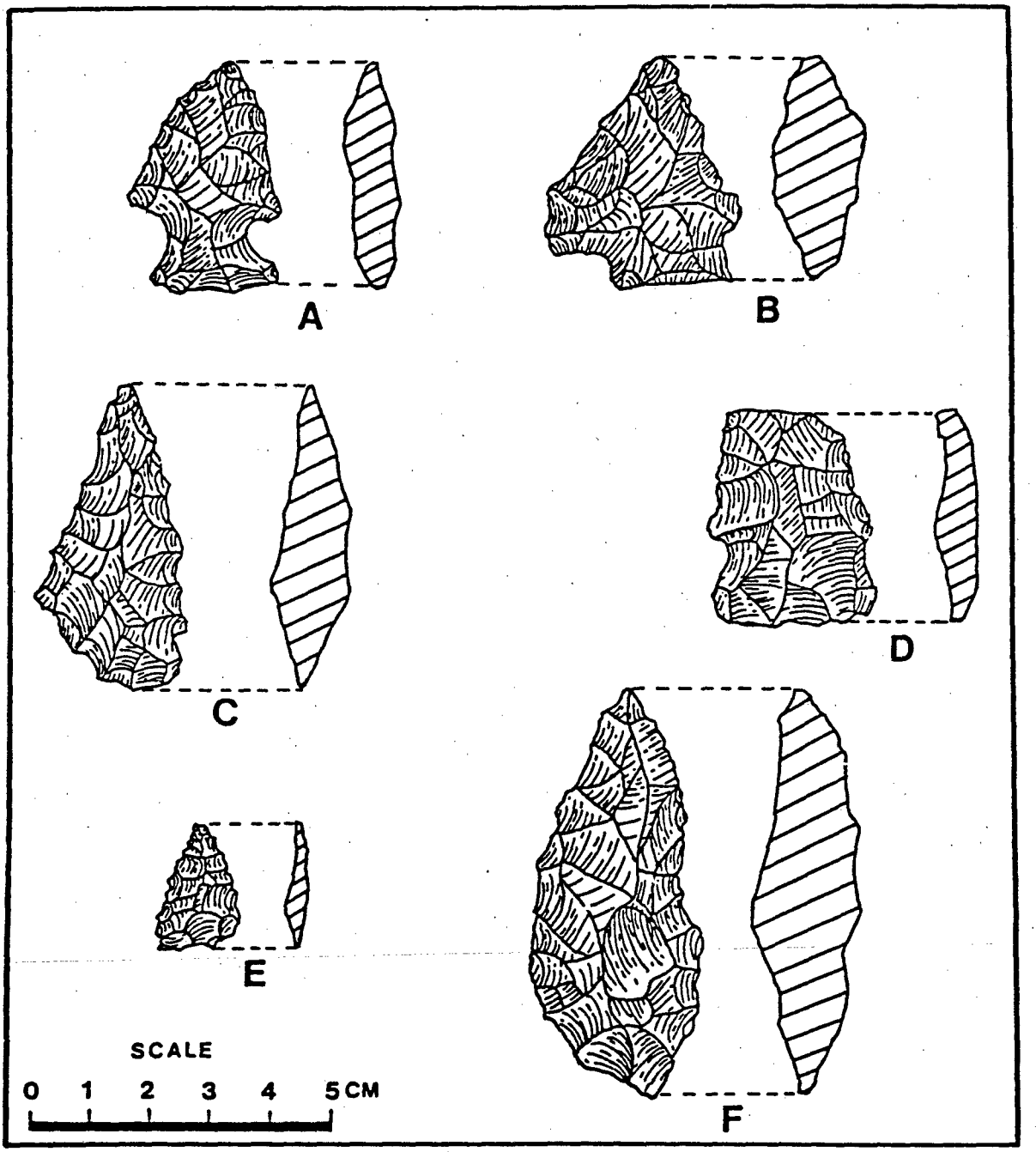


PLATE 3

Lithic artifacts from LCX#3. (A) Epps projectile point. (B) Delhi projectile point. (C and D) Bakers Creek projectile points. (E) Fresno projectile point. (F) Preform.

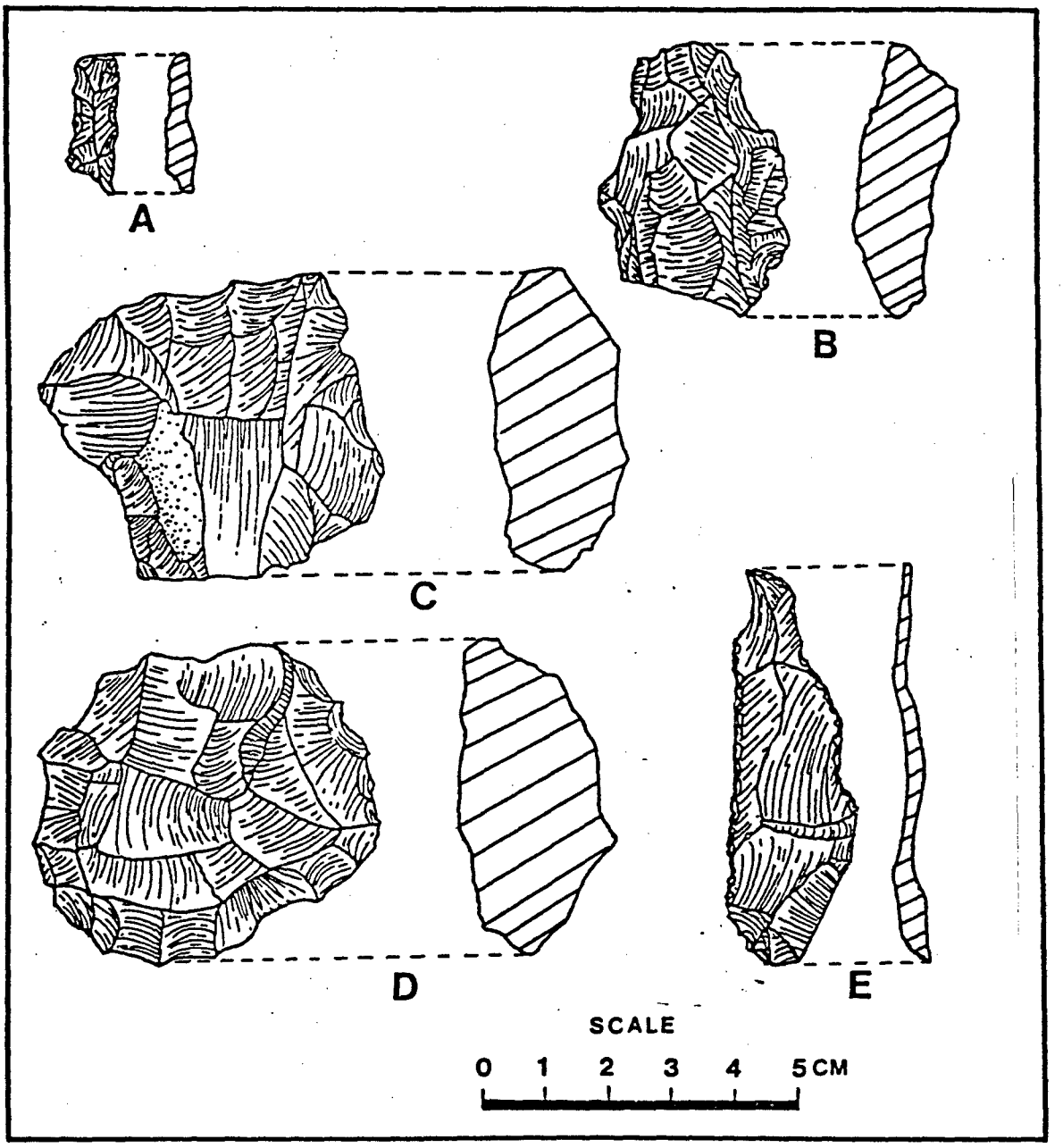


PLATE 4

Lithic artifacts from LCX#3. (A) Drill fragment. (B) Biface. (C and D) Bifacial cores. (E) Utilized blade.

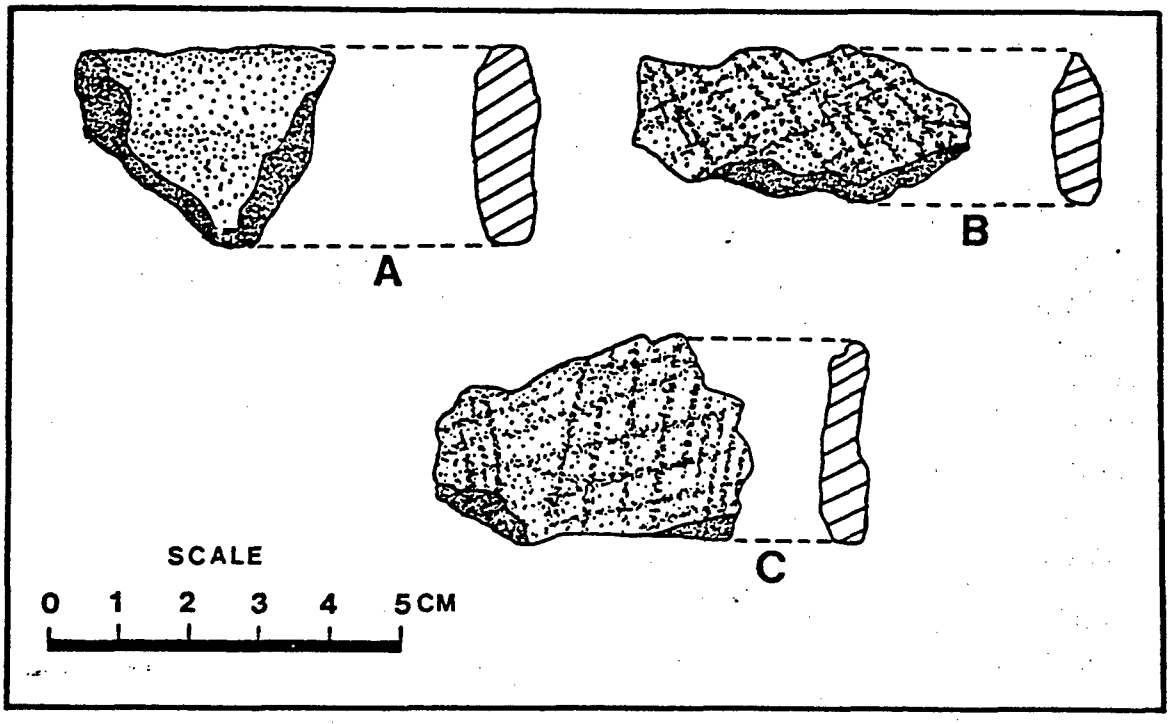


PLATE 5

Prehistoric ceramics from LCX#3. (A) Barnes Plain rim sherd. (B and C) Barnes Cord Marked body sherds.

nodules were present. Stratum III was made up of a very pale brown (10YR 7/3) sand with some krotovina. Stratum IV was yellowish brown (10YR 5/4) fine grained sand. The lowest stratum, Stratum V, was composed of gray (10YR 5/1) clay with numerous iron oxide stains.

Analysis of the lithic specimens recovered during cut bank examinations resulted in the identification of one piece of debitage and a miscellaneous unmodified rock. The piece of debitage is a primary decortification flake made from Crowley's Ridge chert.

Investigations of this prehistoric site reveals it to apparently be an isolated prehistoric find. This precludes any determination of site function.

The only historic artifact inventoried from the site was recovered in a shovel test pit. The specimen was identified as a fragment of a rusted metal file. Data is insufficient to substantiate a historic component for this site.

Summary of Prehistoric Resources

Only one of the two prehistoric sites inventoried in the Below Locust Creek Landside Ditch project contained sufficient data to establish a temporal range of occupation which includes the Late Archaic, Middle and Late Woodland, and Mississippian Periods. Table 18 lists the prehistoric sites together with their estimated sizes, chronological position, and the ground surface visibility recorded at each site. The dates of occupation are within the expected span of time for occupation for the area, based on Saucier's (1974) estimate of the age of Braided-Stream Terrace No. 2.

Site LCX #3 contained the only culturally diagnostic artifactual materials recovered during the survey. The other prehistoric site, LCX #4, was determined to be an isolated prehistoric find consisting of a single piece of debitage.

Both the Late Archaic and Mississippian Period components identified for LCX #3 are tentative. Data substantiating these occupations consists only of recovered projectile points roughly similar to diagnostic types associated with the Late Archaic and Mississippian Periods. Woodland Period occupation at LCX #3, particularly during the Late Woodland, is well substantiated by the presence of Barnes ceramics and several associated projectile point types.

Both of the prehistoric sites inventoried during this project are located in soil environments that are somewhat poorly drained according to the USDA (1969) classifications. This data favorably compares with the results of the Locust Creek survey (Iroquois Research Institute 1978b) and the Upper Buffalo survey (Iroquois Research Institute 1980) to the east. Data from the present project indicate a site occurrence rate of 753 sites per square mile in the somewhat poorly drained soils of the Askew series. The low site frequencies and the small size of the area surveyed limits the validity of this statistical relationship.

Tables 19 and 20 summarize the prehistoric artifact collections recovered during the field investigation of the Below Locust Creek Landside Ditch project area. The systematically gathered collection includes a total of 167 artifacts. When

TABLE 18

PREHISTORIC SITE SUMMARY

SITE NUMBER	SITE SIZE IN SQUARE METERS	PERCENT OF GROUND SURFACE VISIBLE	CHRONOLOGICAL POSITION
LCX #3	136,000	76-100	Late Archaic, Middle and Late Woodland, Mississippian
LCX #4	1	26-50	Unknown

all cultural material within a strictly defined provenience unit is collected, the collection is considered to be systematic. Therefore, all artifacts which were recovered from shovel tests, test excavations, intensively collected grid units, and cutbank examinations are included in the systematic collection table. The selectively sampled collections result from either (1) less than total artifact recovery within a specific provenience unit or (2) recovery of artifacts outside of a strictly defined spatial provenience unit, such as the collection of an isolated surface artifact or selective surface collections. The artifacts selectively collected total six. Lithics are the predominant artifact types collected in both the systematic and selective sampling procedures.

The inventory of lithic materials recovered during the survey and testing project is presented in Table 21. Included are materials recovered from both the systematic and selective collections. They are subdivided according to major artifact classes. The majority of the identified materials are locally available in the Crowley's Ridge gravel beds. These include Crowley's Ridge chert, sandstone, and orthoquartzite. Most of the unidentified cherts probably originate from the Ozark Highlands or from formations in western Tennessee.

Locally available materials account for 95% of the collections with the remainder comprised of possibly exotic unidentified cherts. Among the major artifact classes, potentially exotic materials are proportionally most represented among bifaces and cores.

The low yield of the survey provides insufficient data to confidently discuss subsistence, functional interpretation of sites, significance of site sizes, or differential utilization of topographic zones within the project area.

Summary of Historic and Architectural Resources

One historic component was recorded during the survey of the project area at site LCX #3. The artifacts at this site included construction materials such as concrete, nails, and brick as well as other materials indicative of domestic activities. This assemblage appears to be primarily mid-20th century. The site does not exhibit evidence of a foundation or in situ structural remains. However, cartographic evidence indicates the presence of a former structure at this location.

Two architectural sites were recorded in the project area. Both the sites are products of the 20th century and reflect the rural character of the St. Francis Lowlands. As expected, no examples of formal architectural design were found.

The customary use of certain building methods and materials, such as balloon framing and corrugated sheet metal, is demonstrated by the structures surveyed as is a certain economic expediency characteristic of the rural environment by the conversion of school buses into living quarters.

All the extant structures documented during the survey apparently were constructed within the last 20 years.

TABLE 19

INVENTORY OF PREHISTORIC ARTIFACT COLLECTIONS: SYSTEMATIC SAMPLE

SITE	Bifaces	Flake Tools	Blades	Cores	Debitage	Ground Stone	Cobble Tools	Manuports	Modeled Clay	Modified Bone	Modified Shell	Miscellaneous	Composite Tools	TOTAL
LCX #3	4	2	2	2	113	0	0	0	17	0	0	26	0	166
LCX #4	0	0	0	0	1	0	0	0	0	0	0	0	0	1
TOTAL	4	2	2	2	114	0	0	0	17	0	0	26	0	167
PERCENTAGE	2.0	1.0	1.0	1.0	68.0	0	0	0	10.0	0	0	17.0	0	100%

TABLE 20

INVENTORY OF PREHISTORIC ARTIFACT COLLECTIONS: SELECTIVE SAMPLE

SITE	Biface	Flake Tools	Blades	Cores	Debitage	Ground Stone	Cobble Tools	Manuports	Modeled Clay	Modified Bone	Modified Shell	Miscellaneous	Composite Tools	TOTAL
LCX #3	4	0	0	2	0	0	0	0	0	0	0	0	0	6
LCX #4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	4	0	0	2	0	0	0	0	0	0	0	0	0	6
PERCENTAGE	67.0	0	0	0	33.0	0	0	0	0	0	0	0	0	100%

Table 21

INVENTORY OF LITHIC MATERIALS

Lithic Materials	Biface	Flake Tool	Blade	Core	Debitage	Ground Stone	Cobble Tool	Manuport	Miscellaneous	Total	Percent
Crowleys Ridge chert	4	2	2	3	112	0	0	0	16	139	90.0
Unidentified chert	4	0	0	1	0	0	0	0	3	8	5.0
Sandstone	0	0	0	0	0	0	0	0	6	6	4.0
Sandstone - silica cemented Orthoquartzite	0	0	0	0	1	0	0	0	1	2	1.0
Total	8	2	2	4	113	0	0	0	26	155	100%
Percentage	5.0	1.0	1.0	3.0	73.0	0	0	0	17.0	100%	

RECOMMENDATIONS

Significance of the Resources

The following discussion of the significance of the cultural resources inventoried during the field survey of the Below Locust Creek Landside Ditch Cleanout Project is based on the criteria for evaluation of cultural properties for inclusion in the National Register of Historic Places. The Advisory Council on Historic Preservation has established the following criteria of significance:

National Register criteria for evaluation. The quality of significance in American history, architecture, archaeology, and culture is present in districts, sites, buildings, structures, and objects of State and local importance that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and

(a) That are associated with events that have made a significant contribution to the broad patterns of our history; or

(b) That are associated with the lives of persons significant in our past; or

(c) That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

(d) That have yielded, or may be likely to yield, information important in prehistory or history (Code of Federal Regulations, Title 36, Chapter I, Part 60.6).

The literature search, archival review, cartographic review, interviews, and field investigations have yielded no evidence that any of the inventoried sites can be associated with significant events or important persons in local, regional, or national history. None of the architectural sites identified during the survey have been deemed to embody sufficient architectural merit or craftsmanship to justify a nomination to the National Register under criterion "c". In summation, none of the four sites that have been inventoried qualify for inclusion in the National Register of Historic places under criteria "a", "b", or "c" listed above.

However, one of the prehistoric sites, LCX #3, contains cultural deposits of sufficient scientific importance to determine that it should be considered potentially eligible for inclusion in the National Register of Historic Places under criterion "d". This criterion implies that the data base at a significant cultural resource site can contribute to the understanding of prehistory or history. The significance of the site which is considered potentially eligible for the National Register will therefore be discussed in terms of the site's potential to yield information on topics of local and regional prehistory which are presently poorly understood or which are currently being investigated by scholars with active research interest in the area.

None of the architectural resources are considered to be potentially eligible for the National Register since these resources are generally of rather recent construction and do not represent outstanding examples of housing types or architectural styles. The most important architectural details have been

systematically recorded during the survey: structure type; construction materials; roof shape; number of stories; type of foundation material; number and location of chimneys; number, type, and construction of windows; physical condition; associated buildings; and estimated date of construction.

The historic archaeological resource is not considered potentially eligible for the National Register. This resource is related primarily to recent occupation of the area. The site is characterized by limited artifact content, a lack of integrity resulting from plowing, and a lack of intact subsurface features such as foundations or wells. The site's location, size, and artifact assemblage has been recorded during the survey.

Given the amount of data that has been recorded for the architectural and historic sites and the limited potential of these sites to furnish additional information, implementation of the project as planned would probably not cause an adverse impact to the historic and architectural resources of the area.

The prehistoric resource which is not considered to be potentially eligible for the National Register has been designated an isolated find and as such is considered to possess a limited data potential. Information regarding this site's location and artifact assemblage has been systematically recorded during the field investigation and laboratory analysis phases of this project. The project related impacts to the prehistoric site which is not considered potentially eligible do not represent a significant adverse effect to the prehistoric resource base of the project area.

Evidence recovered from site LCX #3 suggests occupations during the Late Archaic, Woodland, and Mississippian Periods. The study of which may contribute to the knowledge of the local or regional prehistory concerning these periods.

With the exception of Dalton manifestations, there is little evidence of prehistoric occupation of the northeastern Arkansas and southeastern Missouri lowlands prior to the Late Archaic Period. In this area, there is an apparent occupational hiatus during the Middle Archaic Period, and several investigators have suggested that a rapid population increase occurred during the Late Archaic Period (D. Morse 1975b; Price et al. 1976; Krakker 1977).

Despite the abundance of Late Archaic remains in the area, archaeologists have paid relatively little attention to them. Dan Morse (1975b) has defined two possible Late Archaic phases, Frierson and Weona, in northeastern Arkansas. In southeastern Missouri, the Poverty Point related O'Bryan's Ridge phase has been defined (Webb 1977).

As site LCX #3 produced evidence of occupation during the Late Archaic Period, further investigation of this site may provide answers to some of the basic questions concerning regional culture history.

Located south of the project area is the Zebree site (3MS20). At the Zebree site, several prehistoric components were excavated, including Late Woodland, Early Mississippian, and Middle Mississippian occupations.

The abundance of Late Woodland occupational components in the northern Mississippi Alluvial Valley has led Morse to suggest a rapid intrusion of Late Woodland cultures into uninhabited territory (D. Morse 1977c). The Late Woodland Barnes culture was characterized by a weakly structured socio-political organization in contrast to the more strongly structured Baytown cultures which were contemporaneous with and surrounded Barnes to the west, south and east.

The Below Locust Creek Landside Ditch project is wholly within the area of distribution of the Barnes ceramic tradition. The Barnes settlement system consisted of villages composed of individual household units that came together and separated on a seasonal basis (D. Morse 1977f). At the Zebree site, the Barnes occupation was interpreted as a winter village consisting of up to five household units (Ibid).

Given the presence of preserved subsurface cultural deposits at site LCX #3 and that the major prehistoric component is evidenced by Barnes ceramic types, Morse's model by the Barnes settlement system could be tested by further investigation of this site.

The Mississippian component at LCX #3 could also provide information to supplement the research undertaken in connection with the Zebree project. Research objectives that should be addressed at this site include identification of the floral and faunal assemblages, and functional definition of Mississippian occupations as seasonally occupied farmsteads, hamlets occupied on a year-round basis; satellite communities linked to larger villages, or some other type of settlement. Once these basic questions are resolved, then more sophisticated research questions may be formulated and Morse's (1977h) hypothesis of a small Mississippian group intruding into Barnes territory and gradually acculturating the Woodland groups may be further refined and tested.

Project Impacts on Potentially Eligible Resources

Adverse impacts which may affect significant cultural sites are related to the channel cleanout activity planned for the project area. Engineering projects of this nature are usually initiated by removal of vegetation along the ditch banks and portions of the right-of-way where construction vehicles will operate. Machinery such as a bulldozer is used to clear obstructing vegetation from the channel banks and to dispose of this material in a location where it will not interfere with construction machinery. In some cases, the removed vegetation is burned. The actual channel cleanout to restore the ditch to its original dimensions will be accomplished by a long boom dragline. The dragline will operate down one side of the channel with excavated material to be deposited along the existing levee.

Any cultural property which lies in the right-of-way may, therefore, be subject to adverse impacts caused by: (1) movement of heavy machinery, (2) the uprooting of vegetation, (3) the disposal of waste vegetation, (4) the dumping of excavation spoil. In addition to these primary impacts, further disturbance of archaeological deposits may be caused by continued agricultural activities such as plowing, land leveling, and the clearing of land for agricultural use.

The nature of adverse impacts to site LCX #3 has been determined by an examination of the site's position relative to the construction plans for the project (Corps of Engineers map file 41L/58).

Site LCX #3 is located on the left descending bank of the Below Locust Creek Landside Ditch extending from the top of the ditch bank to approximately 80 meters beyond the right-of-way limits. The portion of the site which is bounded by top bank of the ditch and inside edge of the adjacent levee, an area of 3600 square meters, will be exposed to all adverse impacts associated with the channel cleanout activity.

Summary Recommendations

One prehistoric site (LCX #3) is considered to be potentially eligible for inclusion in the National Register of Historic Places; therefore, the Corps of Engineers will consult with the Arkansas State Historic Preservation Officer regarding its eligibility and seek a formal determination of eligibility from the Secretary of the Interior.

In the event that site LCX #3 is formally determined to be an eligible property, then the Corps of Engineers will apply the Criteria of Effect and the Criteria of Adverse Effect as outlined in "Procedures for the Protection of Historical and Cultural Properties" (Code of Federal Regulations, Title 36, Chapter VIII, Part 800). Present documention indicates that site LCX #3 will be adversely affected unless significant changes are made in the project design.

In the event that site LCX #3 is found eligible for the National Register, the following actions and project design modifications will be implemented to accomplish impact avoidance: (1) delineating the site boundaries within the right-of-way in the field and on design plan specifications; (2) including in the construction specifications instructions to halt all activities related to channel cleanout at the site boundaries, and (3) strictly limiting the passage of all machinery to the levee road when passing through the designated site area. It is further recommended that close monitoring by an archaeologist of the channel cleanout activity be conducted when construction approaches the portion of the site that could be potentially impacted.

A total of 22.6 acres (approximately 18.7%) within the project right-of-way was not surveyed because of standing water. Of this total, approximately 18.3 acres is classified as permanent wetlands based on topographic evidence (Leachville, Ark-Mo. 15') and on site observation. The remaining area is subject to frequent flooding as confirmed by recent reconnaissance of the area. The potential for discovery of any cultural sites in these areas is extremely low. These areas should be considered to have been adequately evaluated for compliance with the National Historic Preservation Act, the National Environmental Policy Act, Executive Order 11593 and the Procedures for the Protection and Enhancement of Historic and Cultural Properties (36 C.F.R. 800).

Finally, it is likely that some very small surface sites were undetected during this survey and there is also some likelihood that buried sites exist within the project area. Should additional sites appear during construction, the Corps of Engineers should ascertain if they meet the criteria of eligibility for inclusion in the National Register. If cultural properties identified during construction are

determined to be eligible for the National Register, the Corps of Engineers should, in consultation with the Arkansas State Historic Preservation Officer, determine what effect the project will have on the properties and initiate appropriate mitigation measures, if necessary.

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INTERVIEWS

5 May 1980

Mrs. Betty Brown, a resident of LCX #1, was interviewed by T. Hoefer of Iroquois Research Institute.

6 May 1980

Mr. Cleo Walker, a resident of LCX #1, was interviewed by J.R. Todd of Iroquois Research Institute.